

2018 9MR Road Assessment

April 2018

Compiled by Kirk Johnson

There are some quick rough overall budget calculations at the end of this report, synopsising a few overall budget perspectives the BOD may choose to use right now; there are way more maintenance needs than the budget allows, so some tough choosing for spending needs to be incorporated.

Purpose and Use of This Report

For the Board's fiscal management use:

1. A total diagnosis and current price estimation of all needed 9MR road maintenance and repairs, not including weed/vegetation spray. Immediate, mid, and longer-term items are included, as well as suggested long-term 'capital improvement' items that either improve driver safety and/or become more relevant as traffic increases.
2. Expenditure items herein are assigned suggested prioritization, based on this order:
 1. road plane erosion control and minimizing threat of road washout
 2. maintaining functional watershed mechanics
 3. maintaining roads being able to support the weight and duty of year-round auto traffic and seasonal large truck traffic
 4. driver safety
 5. higher traffic road sections maintained ahead of lesser traffic sections

Scope of Analysis and Report

- One Saturday in early spring, myself, Brett Coffman, Craig Jordan, and Ron Hesse toured Divisions 1, 3, 4, 7 and 8.
- The next Sunday myself, Craig Jordan and Ron Hesse toured the remaining Divisions.
- The day before, I reinspected many spots on Division 7 in consideration of Felicity and Brian Rabe's inspection of Division 7 roads (see their report, attached).
- One week later I met with Tim Roberts, 9MR road contractor, to go over many aspects of the touring and other related short and long-term road questions and feedback, as well as inquiring of many points of his knowledge of maintenance history.
- Throughout the time above I counseled occasionally with Brett Coffman for his feedback on methods and pricing, including he inspecting several additional questionable spots for subsequent feedback.
- This report was written and priced at the responsibility of Kirk Johnson.

Additional Comments

- Sales taxes are not factored into prices shown.
- Prices are based on spring 2018 pricing.
- Items that have lettered designations correspond to letters shown on official drive maps, per each Division.
- Depending on the choosing of a final list of repairs and the order in which those repairs are ordered to be done, the prices shown may vary depending on efficiency for work contractors.

- Inflation price increases should be given to long-term and Capital Improvements prices herein if those items are performed in the future and not now.
- The installation of replenishment gravel (gravel needed because of regular traffic wear) is designated as a separate section under this report. Current 'best calculations' (see linked report at <http://assuredcomputer.com/kirk/bcvi.pdf>) for gravel wear estimate that at current traffic levels and prices we should be installing approximately \$8100 (w/tax) worth of gravel per year to replenish worn gravel.
- Itemized prices include figuring for machine location fees.
- Raking is prescribed to perform two benefits: 1) crowning roads so that water runs off to the side ditches and culverts ASAP, and 2) to remove rutting running down the road planes, such rutting which causes water to increasingly erode and soften road planes.

Legend for Prioritization

There is a “STAGE” designated after each item price:

- STAGE 1 items represent items that should be sought to be budgeted and performed in the immediate maintenance season, these items presenting immediate threat to road composition and also pose greater unnecessary higher repair costs if left unperformed.
- STAGE 2 items are lesser in priority as a threat to road composition or driver safety but should be given consideration to performing ASAP, budget depending. They may also be related to the fact that road of subject is currently less traveled than other main roads. The performance of these items also represents lowering long-term maintenance costs because if the items are performed they will eliminate or lower the need for otherwise increased regular ongoing maintenance items.
- STAGE 3 items are longer-term items that represent a deficiency in a road section but it's not critical to current safety or maintenance needs, especially considering the tight current budget constraints.

Other Legend/Definitions

- TR = Tim Roberts (main road work contractor)
- rip-rap = large diameter jagged shale gravel
- deeper raking = additional passes of raking, beyond typical, meant to aggressively affect road crowning because road crowning has been neglected; 25% added to typical per-mile costs. Please see this link <http://assuredcomputer.com/kirk/bmcs1.pdf> to view actual historical raking costs per mile that this assessment/report involves.

I. General Items

1. Tour and work order with contractor(s) \$210.00 **STAGE 1**
I don't know if the contractor(s) will want to be reimbursed for this time, but it takes many hours to tour up to 36 miles of road repairs and designate/talk/final counsel/mark ground/document about total work orders. This is for 6 hrs x \$35.00 per hour.

2. Volunteer's auto mileage, copies \$200.00 **STAGE 1**
 This is to reimburse the agent(s) (road manager, committee) for their auto mileage costs for all touring for the maintenance season, and for copies of tour mark-up maps and presentation copies to other members, BOD, etc.
 1. Initial assessment tour mileage = 115 miles x \$.535 (current federal mileage rate) = \$62.00.
 2. Another total tour through the season for work order creation, etc. = \$62.00
 3. Equivalent of half a tour, to administer/check work progress and issues = \$31.00
 4. Paper copies of road drive maps for tour and work order use, distribution to committee and BOD members = \$15.00.

3. Culvert cleaning/inspection, by-hand \$750.00 **STAGE 1**
 Work done with shovel. Also inspect and note inlets/outlets that are more work than a shovel can do for a machine to come back for. Also note culverts that are silted more than 1/3 for later water washthrough with water truck and pump.

4. Culvert inlet/outlet machine cleaning \$375.00 **STAGE 1**

5. Follow-up check of culvert cleaning \$160.00 **STAGE 1**
 This is having the contractor (not the employee who did the labor but the man who accepts liability) take the time to make sure all cleaning was thoroughly done. According to my understanding, this step has been historically neglected, somewhere between the Road Manager and the contractor, and one day it may result in a washout and an expensive repair. I am also aware, via the contractor, that indeed some culverts were left uncleared last fall.

6. Removal/limbing of obstructing trees and shrubs \$8000.00 **STAGE 1+**
 It is has long been observed that trimming/removing roadside-encroaching shrubs and trees is overdue. Some main negative consequences to the encroaching vegetation are:
 - They reduce the width of the driving plain, causing uneven wear ('one-tracking') on roads (which channels erosion straight down roads), and
 - They cause snow plowing to be narrower in the winter.
 Both issues also increase driving risk and decrease on-coming traffic passage. Tydoga LLC, Tyler Coffman @ 206.730.6446, has submitted the above *estimate* for trimming/removing all trees and shrubs within 5' of all roadsides, and to de-limb larger trees from the ground up to 16' high on the trees that are better left alone but just limbed. The estimate is 'time and materials', and I was told that it is more likely to be toward as little as \$6000 and less likely toward \$10,000. The trimming can also be done in portions over successive years, removing the worst first, etc, and allowing us to manage the cash flow better. 2 or 3 sessions has been consented by them. Trees are the property of the land owner; they will be left laying on the owners' land.

7. Power/phone line location \$120.00 **STAGE 1**
 As is well-known among prior and current managers/directors/contractors, there are quite a few roadside maintenance ditches where power/phone lines were originally installed and they are very shallow; some have been struck during prior ditch maintenance, and now 'locating' is

a standard procedure. This rough-guess estimation is for the contractor to take the time to mark the suspected ground for the utility services to come out and mark line positions.

8. Marking supplies \$75.00 **STAGE 1**
Cost for wood stakes, flagging, marking tape, spray paint, etc. to mark necessary work spots. Last year some \$600(?) of gravel was dumped in the wrong spot because of insufficient ground marking, documentation and communication.

9. Placement of replenishment gravel \$8100.00 **STAGE 1**
As stated above, best calculations show we lose this amount of gravel each year due to traffic. If this amount is not being replenished yearly– which has not been for many years – then the roads are deteriorating, not being maintained. Recommended road sections for replenishment gravel are listed in a separate section at the end of this assessment report; it is mentioned here as an added budget awareness/emphasis.

10. Reserve fund deposit \$3357.00 **STAGE 1?**
Per CCRs and state law requirement, annual deposit of savings to set aside for future expenditures. To date no state-sanctioned formal study for this rate has been conducted, but in 2005 and 2017 Kirk Johnson created calculations estimating this amount (please see <http://assuredcomputer.com/kirk/brfc.pdf>). It is understood that the 9MR income rate right now is too low to meet all maintenance needs, other expenses, and make an adequate reserve fund deposit... nonetheless, the BOD must keep this deposit in mind and attempt to manifest it ASAP because to avoid/delay it means jeopardizing future road conditions and funds, also increasing the chances of the need for a special assessment (which is not an automatic passage, as it requires a 25% consent vote of the membership).

11. Funds for state-required Reserve Fund Study \$?????? **STAGE 1+**
RCW 64.38.065 requires the BOD satisfy reserve fund study specifications; this has not been achieved. A comprehensive study/review by the BOD of what the scope of these requirements and costs are is yet to be done; it could involve being required to hire an independent professional reserve study consultant (as the recently-resigned BOD paid a lawyer to start the process for), and it might be possible that some qualified HOA volunteers may also be able to conduct this study. If we have to hire the independent professional... The most recently-received HOA attorney bill shows that the prior BOD paid them to find qualified sources but as far as records show there has been no pricing information secured, so we can only speculate what that potential cost could be. Given the scope of professional talents a qualified reserve study professional would appear to need (accounting, fiscal planning, civil engineering), and given how much 'assets' our corporation has (the responsibility to maintain 36 miles of roads) I speculate that the professional hourly rate and total hours will be significant. It would be wise to **entertain the thought of \$8000 - \$20,000** if for no other reason than to be realistic about the level of fiscal commitment we may be in for. We are currently in violation of state law by not having performed this study by now, and it is becoming public knowledge among the membership about this violation ,as well as needing the critical fiscal analysis such a study will provide to us to plan for sustainability of the HOA; the BOD has been running more or less

blind/ignorant about long-term fiscal sustainability, and this study will clear up those huge unsettled fiscal determinations. The following linked (<http://assuredcomputer.com/kirk/oasj2.pdf>) was written to inform the reader in general about the issue of the required reserve fund study.

12. Sales taxes on chosen expenditures \$?????? **STAGE 1**
 No 8.2% sales tax has been added to any listed expenditures herein.
13. Additional winter time road sanding \$?????? **STAGE 1**
 An amount for this would be prudent to consider now in figuring the year's budget in coordination with necessary road maintenance chosen. Winter traffic has been increasing, and that places a need/desire for greater road safety for on-coming traffic, etc. Last winter there were substantial safety problems with ice and oncoming traffic; the only viable solution to that is regular adequate sanding. The BOD needs to decide if an investment in this should be made. The following comments arose from my recent conversation with our sanding contractor (TR):
1. The current sanding regimen and physical set up has been too infrequent and amateur to be able to perform adequate levels of sanding.
 2. The BOD has requested too little and too infrequent sanding for the contractor to financially justify investing in a feasible set up. The sand needs to be purchased dry and kept dry under a covered building that is also tall enough for the contractor to machine load his into his sanding hopper. The contractor has a covered space that might be able to be used for this, but this requires occupying the value of it and fiscally justifying it.
 3. More sanding – or a minimum payment to the contractor – has to be ordered from the contractor for him to invest in the proper sanding set up and the expense and time costs for him to respond to sanding calls.
 4. I asked him to work up a proposed pricing/ordering scenario that can be financially feasible for him. This could be in the \$1000 - \$2000 range, but no fiscal planning should be made until a firm estimate is given from the contractor.

Work Spots by Division

Some of the items below may be labeled by a quoted alphabetic letter (eg. “A”) and correspond to official marked up copies of road drive maps created during initial touring assessment

II. Division 1

1. “C” = \$125.00 **STAGE 1**
 North end of Point Drive, approximately 1600 feet from Nine Mile Road. The site of last year's wash-out repair. Ditches need attention, better sloping, deeper shaping of large gravel in south ditch to receive and keep large volume run-off water, removal of high spots obstructing ditches from receiving water drainage from roads, remove pile of roadside rip-rap gravel. Crown raking addressed elsewhere.
2. Machine ditching, upside of north Point Drive/Sunset Ridge intersection. \$100.00 **STAGE 1**
 About 40-60'.

3. "A" \$200.00 **STAGE 1**
Approximately .4 miles south on Point Drive from Homestead Spur; about a 500' stretch of road; aggressive raking for crown and corner roiling to improve watershed off of road.
4. Raking mileage, 2.5 x \$333.00 \$840.00 **STAGE 1**
Rake for crowning from Point Drive south, at Nine Mile Road, to the "A" position in #3 above.
5. Deep raking #4 above; 25% added \$210.00 **STAGE 1**
6. Raking mileage, 1.5 x \$333.00 \$500.00 **STAGE 1**
Rake for crowning from Sunset Ridge south to Canyon Spur.
7. Deep raking #6 above; 25% added \$125.00 **STAGE 1**
8. Improve steeper grade on Homestead Spur \$4940.00 **STAGE 3**
This 396' of road section is steep, lacks good surface gravel, was built upon surfaced foundation slab rock such that ditching on the south side is impossible, and it therefor causes water erosion/siltation to run across the road instead of the runoff making it to the downstream culvert. There is one residence up this road. The goal is to build up the road section such that a ditch can be maintained, and also using quality jagged crush gravel layers because its a steeper incline.
 1. \$2340.00 for 4" thick x 396' long x 18' wide 1 1/4"-minus base gravel.
 2. \$225.00 for TR dozer time to grade above.
 3. \$1925.00 for 3" thick x 396' long x 18' wide gray McNall 5/8"-minus gravel topping; tis product can be raked/graded long-term, and it stays put on inclined roads.
 4. \$450.00 for TR to crown rake/doze.

III. Division 2

1. Rake mileage; I+mile \$380.00 **STAGE 1**
Allen road, from Nine Mile road to the end of Allen 2 turn-around.
2. Deep raking #1 above; 25% added \$125.00 **STAGE 1**
3. Condition erosive deep ditch 200' up Allen drive \$625.00 **STAGE 2**
 1. \$500 (2) loads rip-rap
 2. \$125.00 for TR mini excavator to shape the product in the ditch.

IV. Division 3

1. Rake mileage, plus deeper raking; .83 miles x \$333.00 \$370.00 **STAGE 1**
2. "B" culvert inlet conditioning \$1295.00 **STAGE 2**
On the west side of Wagon Wheel road at 47 Wagon Wheel road; the confluence of a private culvert and the association culvert at a joint inlet currently has steep embankments that erode into the inlet basin and cause impeded culvert flow and regular maintenance expense to clear.

1. \$500.00 for (1) truck load large stacking rock (dump this on lower Div. 8 for use of excess).
2. \$125.00 for TR to load necessary amount of large stacking rock and transport it to Wagon Wheel site.
3. \$300 for TR to stack rock in inlet.
4. Owner at 46 Wagon Wheel says they'll draw out the siltation/growth at the outlet end of the culvert crossing Wagon Wheel, no-charge to the HOA.

3. TR machine ditch upstream \$75.00 **STAGE 1**

V. Division 4

1. Rake mileage; 1.15 x \$333.00 \$383.00 **STAGE 1**
On Old Tressle from Chesaw road to top of grade where old railroad bed confluences.

2. Deep raking, #1 above; 25% added \$96.00 **STAGE 1**

3. "B" fix watershed \$275.00 **STAGE 2**
On the north side of Point Drive south, about 100' up grade from Eagle's Nest intersection, this road side has grading impediments to proper watershed, causing water runoff to run down the road, causing erosion, siltation, and rutting when wet. The bermed area needs to be knocked off and ditching created, allowing water to flow to downstream culvert.

1. \$200.00 for TR excavator time.
2. \$75.00 for deeper rake crowning in the area.

4. "E" take down Nine Mile Ranch sign falling over Pine Bluff \$200.00 **STAGE 1**
The large log posted sign, hanging over and across the road, has long been leaning more and more and is dangerously ready to fall on/across the road. The price is a direct estimate from TR. Tom Rise, the landowner of that easement, has been contacted by myself and Dan Vanover receiving permission to trim the posts to 6' high (they attach to his cattle grate).

5. Rake mileage; 1.2 miles Pine Bluff from Chesaw Road x \$333.00 \$400.00 **STAGE 1**

6. Deep raking, #5 above; 25% added \$100.00 **STAGE 1**

VI. Division 5

1. Condition erosive embankment \$325.00 **STAGE 2**
About .25 miles down Mallard Drive from Nine Mile road there is a ditch stream that outlets off the south side of the road embankment and is eroding because of it.

1. \$250.00 for (1) load of rip-rap (½ will be used here, remaining stored for later/other use).
2. \$100.00 for TR machine time to place rip-rap, relocated eroded material back onto road.

2. Remove large sloughage, re-ditch \$300.00 **STAGE 1**
On the part of the steep-embanked road edge on the south side of Mallard Drive where it traverses through the creek ravine, remove the mass sloughage from the ditch, moving it to a roadside pile further down Mallard about .25 miles. Restore ditch where sloughage is.

3. Rake mileage; 2.2 miles x \$333.00 \$740.00 **STAGE 1**
Starting at the entrance to Mallard Drive from Nine Mile Road, go 1.5 miles and continue .7 miles down Meadowlark.
4. Deep raking, #3 above; 25% added \$185.00 **STAGE 1**
5. "D" = ditch Blue Grouse \$200.00 **STAGE 1**
On the steep road stretch immediately above the cattle grate .3 miles from the Mallard Drive intersection.
6. Rake mileage; 1 miles x \$333.00 \$333.00 **STAGE 1**
On Blue Grouse, from Mallard drive intersection to last residence on top of bluff.
7. "E" = reshape road and ditch for erosion control \$320.00 **STAGE 1**
On Blue Grouse, about .45 miles west from Raven's Roost, that corner' watershed and ditching dysfunctional, causing significant rutting and siltation in thee road.
 1. \$120.00 for TR machine time.
 2. \$200.00 for rake sloping/crowning.
8. "G" = fill in giant low water-catch spot in road \$3185.00 **STAGE 3**
1.45 miles down Mallard drive, just shy of the Meadowlark road intersection, there's an approximately 400' long road section that is low compared to surrounding land, and about 100' of that becomes a sump pond during winter runoff, collecting about 8" deep water. The goal is to raise the road section driving surface out of the water and allow the water to permeate beneath the driving layer without disturbing the structure of the road driving plane.
 1. \$1932.00 for 2" angular rock x 12" thick = 69 yards x \$28.00.
 2. \$300.00 for TR machine time to grade 2" rock.
 3. \$503.00 labor and materials to place industry-standard siltation fabric over the 2" rock.
 4. \$330.00 for (2) loads of TR pit run topping.
 5. \$120.00 for TR machine time to grade the pit run.
9. "I" = repair sub-irrigation water permeating road section \$1872.00 **STAGE 2**
About 300' down Meadowlark Road from Mallard Drive intersection there's a natural hydrostatic permeation in the road plane, which has happened about 20% of the last 21 years I've observed it. The water is wicking and pressurizing up from underneath the road, and if/when traffic levels increase enough this section will likely muck up pretty good, potentially impeding reasonable passage, especially for larger trucks. The remedy concept is similar to #8 above.
 1. \$644.00 for 23 yards 2" angular rock.
 2. \$150.00 for TR machine time, walk-down.
 3. \$503.00 materials and labor to place industry-standard siltation fabric over the 2" rock.
 4. \$330.00 for (2) loads of TR pit run.
 5. \$125.00 for TR machine time to shape/grade the pit run.

6. \$120.00 for TR machine time to deepen the seepage ditch on the north side of the road where strong hydrostatic pressure exists.

10. "K" = control hydrostatic spring water flow \$150.00 **STAGE 1**
 Approximately 1.2 miles down Meadowlark from the Mallard intersection, in front of lot 32, there's a strong natural spring that spills out across the road because there's no existing adequate ditch delivering the water to the existing downstream culvert. The obvious simple fix is to install/restore a short ditch section, but it appears possible that both surfaced immovable rock face and shallow power/phone lines may exist there, so ditching may be impossible. TR suggests that, according to his experience, ditching is possible.

11. "L" = condition downhill embankment erosion \$375.00 **STAGE 1**
 This is a recurring maintenance spot, having been attended to similarly before. This road section, on it's north high embankment side, has a very loose and steep earth strata; this prevents it from being ditched and removed on that side without a very large expense. It is at this particular spot that the road water/ditch therefore wants to cross the road and spill off the downhill embankment, eroding and narrowing the road.
 1. \$225.00 for (1) load rip-rap.
 2. \$150.00 for TR machine time to place rip-rap on erosion embankment spot.

12. Stabilize loose earth on embankment with grass planting \$100.00 **STAGE 1**
 About mid-way down the south side of the Mallard drive creek ravine, on the downhill side embankment, there's a wide area of fresh subsoil placement from prior year's sloughage that is eroding into the creek and also undermining about 2' wide of the road.

13. Widen road section \$14,000.00 **STAGE 1**
 Approximately 200' from the culdesac at the end of Mallard Drive there is a 250' stretch of road that is extremely narrow and is a winter snow plowing and driving safety hazard. The uphill embankment side of the road is encroaching the road width with siltation, and the downhill embankment side is erosive; together these dynamics have narrowed the road significantly. Solution: excavate the uphill embankment 7' inward and transport the fill to a nearby roadside storage spot for future fill use (some of the fill can be brought and placed at the culdesac to increase it's turning diameter, as it is currently narrow). For information-sake, the measured and calculated volume of dirt is (130) 10-yard dump truck loads, x 40 minutes to excavate and transport each load, x \$150.00 per hour = \$13,000. Then add another roughly \$1000 for machine time and gravel to get the road stabilized again.

VII. Division 6

1. "A" = Narrow and erosive road width \$600.00 **STAGE 1**
 Approximately .3 miles down Corral drive at a culvert crossing there's a narrow spot in the road and also a simultaneously erosive downhill embankment roadside. Winter-time driving/plowing is especially affected by the narrowness. There is currently a full-time residence down that road.
 1. \$350.00 for TR machine time to transport some fill to the spot and place it and subsequent

- rip-rap.
- 2. \$250.00 (1) load rip-rap.

- 2. "B" = Culvert install \$1200.00 **STAGE 3**
Approximately .7 miles down Corral, on the south side of the road, there's a ditch section that dead ends and outlets to no culvert or continuing drainage slope, so it spills across the road.

VIII. Division 7 (map 1 of 2)

- 1. Rake mileage; 3.5 x \$333.00, all of West Corral \$1165.00 **STAGE 1**
- 2. Deep raking, and wider for exceptionally wide road sections, #1 above; add 25% \$290.00 **STAGE 1**
- 3. "A" = Ditch work \$85.00 **STAGE 1**
Approximately .25 miles past Porky Pine road, at the narrow steep incline, re-establish ditching.
- 4. "C" = Explore ditch \$75.00 **STAGE 1**
On West Corral, approximately .85 miles past Porky Pine in front of lot 4, there's a seasonal runoff stream coming off of lot 8 that overwhelms West Corral. If a ditch can be installed from there down to the next culvert that would be ideal and cost-effective. However, it appears very likely there's surface rock slab immediately below the surface in that area, hence possibly why there's no ditch now. This category is to have TR spend a little time with his mini excavator to see if a ditch can be installed.
- 5. "D" = reshape erosive road corner and ditch \$120.00 **STAGE 1**
On West Corral, approximately .5 miles past Porky Pine, a steep corner turn needs its slope reshaped to shed water off the sides instead of running down the road, plus reestablish the ditching. Aggressive raking, already scheduled above, should take care of filling in existing erosion ruts.

IX. Division 7 (map 2 of 2)

- 1. Rake Horsetrail drive, mileage; .75 x \$333.00 \$280.00 **STAGE 1**
- 2. Rake Big Rock road up to Silver Spur, mileage; .5 x \$333.00 \$167.00 **STAGE 1**
- 3. Deeper raking #2 above; 25% added \$42.00 **STAGE 1**
- 4. "C" = reshape switchback corner, other erosion prevention \$638.00 **STAGE 1**
On the switchback corner of West Corral where it intersects with Gold Rush Ridge road; shape the inside slope just above the turn to channel water off the inside edge before it can travel across the intersection (which it does right now). Install rip-rap on the waterflow slope where channeling water, to prevent erosion. This water delivery path will direct water to the existing inside ditch and culvert just below where people often park on the corner in the winter.

1. \$225.00 TR machine time to reshape corner.
 2. \$225.00 (1) load rip-rap.
 3. \$188.00 TR machine time to place rip-rap.
5. "E" = notify private owner of driveway problem \$0.00 **STAGE 1**
Just above the West Corral switchback, connect with the owner of Lot 44 about that their private driveway water drainage spills across West Corral, causing siltation, rutting, soft road surface, etc.
 6. "G" = improve corner water roiling to prevent erosion and siltation \$225.00 **STAGE 1**
On the sharp corner turn and incline on West Corral immediately across the road from trailhead to the equestrian trail on lots 32/33, reshape the inside part of the turn, and the road crown up from it, to deliver road watershed off the side of the road and disallow water from running down the road and eroding and silting out across West Corral just below the turn. Improve associated ditching. Charge is for TR machine time.
 7. "H" = repair rutting erosion \$520.00 **STAGE 1**
On West Corral, for about a 100' stretch of road just above the turn described in #4 above, install (2) loads of 1 1/4" minus about 3" thick right down the middle of the road. There are currently several fairly deep ruts in the road from lack of crowning and a long stretch of water eroding down the road; the road needs crowning and the ruts need filling, and the road could use some gravel as well. To lay a run down the middle of the road and leave it alone for this year is a cost-effective way to start a crown, fill the ruts, and allow the new gravel to compact into place. This is slightly larger gravel for a top coat (typical top coat is 3/4"-minus), and sometimes its better in the long run depending on how the road plane needs more structural support (larger aggregate can stay in place better under tire pressure and wetness), and if the existing road plane can absorb the larger diameter. The road will be rougher to drive on for a few years – like how Horsetrail and lower West Corral were about 15 years ago when we installed larger diameter gravel there... but the final product settles in and supports traffic with less wear and erosion for the long run.
 8. "I" = Ditch work \$150.00 **STAGE 1**
At the intersection of Outback road and Big Rock, particularly upslope on Big Rock, clear the ditch on the uphill embankment side of the road and make sure water flow gets delivered to the existing diversionary ditch and down to the culvert. TR machine time.

X. Division 8 (map 1 of 3)

1. "A" = ditch and culvert inlet work \$450.00 **STAGE 1**
Approximately .15 miles up Bighorn Drive from Chesaw road on the right side at a private driveway intersection, clear that culvert, clear upstream ditch, and place rip-rap in ditch to help control erosion in the ditch (this area gets cleaned every year; controlling the erosion would be cost-effective in the long run). ½ the load of rip-rap can be used here and the rest saved and used elsewhere.
 1. \$225.00 TR machine time.

2. \$225.00 (1) load of rip-rap.

2. "B" = Seed downhill embankment, (2) sessions \$230.00 **STAGE 1**
 On Bighorn about 150' past the intersection of Canyon View, cast grass seed on the downhill embankment side of the road where freshly-placed bald soil is eroding the road edge. Ideally do this immediately (this spring) and again just before snow this coming fall.
 1. \$100.00 man labor.
 2. \$130.00 for seed and delivery.

3. Rake mileage, all Bighorn, 2.25 x \$333.00 \$750.00 **STAGE 1**

4. Deep rake for #3 above; added 25% \$188.00 **STAGE 1**
 Added emphasis on the first 200' to get rid of erosion ruts in road.

5. Rake mileage, all Pine Grove road, .5 x \$333.00 \$167.00 **STAGE 1**

6. Deep rake for #5 above, added 25% \$42.00 **STAGE 1**

7. "E" = Fix erosive slope and ditch \$1730.00 **STAGE 2**
 On Bighorn, approximately .26 miles past the intersection of Orchard View road, excavate the uphill embankment knob slope to a shallower incline. Truck the excavated material nearby to a road section in need of widening. Clear the ditch to allow water flow to nearby culvert. Cast seed, (2) sessions – one in spring and another in fall.
 1. \$1050.00 TR large machine time.
 2. \$450.00 TR truck time.
 3. \$100.00 cast seed labor.
 4. \$130.00 seed.

8. "G" = Install rip-rap check dams in long inclined ditch section \$1425.00 **STAGE 2**
 On Bighorn, between approximately .3 miles and .5 miles after Orchard View intersection, install up to (8) rip-rap check dam in the uphill embankment ditch. This road section ditch is currently long and steep, which allows runoff water flow to be fast and turbid, causing ditch and hillside erosion. Installing rip-rap dams with approached about every 50' or so will address this problem.
 1. \$675.00 for (3) loads rip-rap.
 2. \$750.00 for TR machine time and dump trailer.

9. Rake mileage for Gold Rush Ridge road; 2 miles x \$333.00 \$666.00 **STAGE 1**

10. Deep raking for #9 above; added 25% \$167.00 **STAGE 1**

11. "J" = Install rip-rap on (2) erosion slopes \$525.00 **STAGE 1**
 About 400' up Bighorn from Chesaw road, on the downhill embankment side of the road, install rip-rap on the embankment in (2) spots.

1. \$225.00 for (1) load rip-rap.
2. \$300.00 for TR machine time.

12. Clear ditch \$75.00 **STAGE 1**
 In the east side of the road ditch on Bighorn near the intersection of Canyon View, clear ditch.

XI. Division 8 (map 2 of 3)

1. "B" = reshape road edge and ditch \$950.00 **STAGE 1/2**
 On Gold Rush Ridge, at the intersection of Lake View Spur and Cougar, on the north downhill embankment off of Lake View Spur, remove the high grade keeping water on the road, reestablish the draw-out ditch, and install (1) load of McNall tight gray gravel.
 1. \$600.00 for TR machine time.
 2. \$275.00 for gravel.
 3. \$75.00 for raking Lake View Spur.

XII. Gravel Placement

Typically there are two reasons for gravel placement:

- Improvement of a particular deficient spot or better erosion control, and
- Replenishment of gravel in road sections that have had traffic wear; referred to as Replenishment Gravel. Again, about \$8000.00 worth of gravel is currently worn away each year from auto traffic (<http://assuredcomputer.com/kirk/bcvt.pdf>). When budgeting, the BOD could choose to count improvement gavel (bullet 1 above) as part of the annual allotment for Replenishment Gravel, but that should be carefully considered and not just automatically classified that way, otherwise well-traveled road sections will get neglected of needed gravel replenishment.

During the tour for this road assessment, several road sections were identified as benefiting from gavel placement for the first reason above; those spots are listed first below. Then all other Replenishment Gravel is listed below that, all in order of highest to lowest priority based on traffic level and history of neglect, if applicable. **BOD please note:** it can be easy to not identify the need for replenishment gravel... a road may look and drive seemingly fine but that does not mean that the gravel surface is not slowly insidiously wearing away and will one day be too thin to support year-round road traffic without damage and impassibility; then needing a *huge* investment in gravel placement all of the sudden.

Civil engineering rule of thumb for gravel placement: install gravel no less than twice as thick as the largest diameter of rock in the gravel. If you don't do this then the larger aggregate in the layer is unlikely to bind and will roll around loose and spread off the road, and will also increase loss of traction for auto tires which in turn causes premature washboard development. This has been a bit of a problem in history here. So for example, 1 ¼-minus gravel should be spread no less than 2.5" thick.

No machining (raking, dozer spreading) costs are included; just truck spreading of gravel is included.

1. Division 8, map 3 of 3, "A" \$825.00
 (3 loads of McNall tight gray shale; the road is somewhat steep, lacks topcoat gravel, and is a fairly high traveled road section. The road base appears to be solid, so finer topcoat gravel should not sink.

2. Division 7, map 1 of 2, "A" \$550.00
 (2) loads of McNall tight gray shale; the road is steep and would benefit from gavel that would stay in place. The road base appears to be solid, so finer topcoat gravel should not sink. This could be counted as Replenishment Gravel.

3. Division 7, map 2 of 2, "D" \$1560.00
 3" thick x 16' wide x 400' long 1 ¼-minus crush gravel = 60 yards x \$26.00. This road section strata is particularly heavy with 'fines' (extremely small particles, like topsoil), which means smaller diameter gravel (like ¾"-minus) will too easily sink into the road and not add structural support to the road for auto weight; so 1 ¼"-minus will bind in well and will strengthen the road surface, supporting auto/truck traffic best. This could be counted partly as Replenishment Gravel. This road section is a fairly high traveled road.

4. Division 7, map 2 of 2, "F" \$1170.00
 All the same discussion and considerations as #3 above; 3" thick x 16' wide x 300' long = 45 yards x \$26.00.

5. Division 7, map 2 of 2, "J" \$780.00
 All the same discussion and considerations as #3 above, except that the road section is lower traveled (one permanent full-time residence travels this section). Another consideration is that we could maybe use some larger pit run ad save costs (the road is flat). This section stays high in moisture content and has a particularly thin current layer of base gravel on it, so it is particularly vulnerable to traffic weight (TR has stated that the road was raked wider over the years, whereby spreading the base gavel thinner and wider).

6. Division 3, Wagon Wheel Road \$5335.00
 The first .3 miles of this road has been among the most well-traveled sections on the Ranch for many years now, plus it sustained the wear of some 100+ logging trucks driving on it in 2016... all of this without any gravel added to the road, and working with only the gravel originally installed on the road in 1996-ish (I'd have to double-check wit TR about this to make sure, as there are no association records showing gravel added there). And back in about 2001/2002 there was some gravel added to the next 400' *after* the first .3 miles discussed here. So the first .3 miles (2000 feet) needs attention; here's the prescription:
 1. First 400' is inclined and has good base = 2" thick x 16' wide x 400' long McNall tight gray shale = 40 yards = (4) trucks x \$275.00 = \$1100.00.
 2. Next 600' is flat and can therefore receive TR's better pitrun = 3" thick x 16' wide x 600' long = 89 yards = (9) truck loads x \$165.00 = \$1485.00
 3. Final 1000 feet is inclined and has good base = 2" thick x 16' wide x 1000' = 99 yards = (10)

truck loads of McNall tight gray shale = \$2750.00

7. Division 4, Crest Drive \$1375.00
The incline run of Crest Drive is especially lacking in rakeable/gradeable material and has a lot of large base rock sticking up significantly. This road has received a lot of full-time residence traffic for most of Ranch history and therefore needs Replenishment Gravel. Also, TR told the BOD last fall that the road lacks rakeable gravel topcoat so much that he almost refuses to rake it anymore; a waste of the Ranch's money and a hardship on his gear.
 1. I recommend 3" thick gravel at a minimum to help get up to the top of the base rock (2" thick would work decently as well)... 3" thick x 16' wide x 350' long = 1400 yards = 5 truck loads of McNall tight gray shale x \$275.00 = \$1375.00
8. Division 4, Pine Bluff, "D" \$550.00
This is a high-traveled and inclined section of road. Adding McNall gray gravel would be Replenishment Gravel, but it would also be an 'improvement' to the road because that gravel stays put so well on inclines. Install 2" thick x 16' wide x 200' long = 20 yards = (2) truck loads.
9. Division 7, West Corral \$660.00
About 3/4" mile from Chesaw road this area of road is wide and high in fines content and could use more structural gravel to resist rutting from driving on it during runoff season. It is also a highly traveled road and needs Replenishment in this area (some lower parts of West Corral have already received gravel some years ago). Its also a relatively flat road section and would do OK with the lesser-expensive TR pit run. (4) loads of TR pit run spread 3" thick x 16' wide = (4) x \$165.00 = \$660.00
10. Division 4, Sunset Ridge Road \$825.00
Approximately 800' up Sunset from the Old Tressle intersection, at about lot 7, this section has a good base with a lot of base rock showing. Its a highly traveled road section and has not received any Replenishment Gravel yet. Its a good candidate for 2" of McNall gray shale. 2" thick x 16' wide x 300' long = (3) truck loads x \$275.00 = \$825.00
11. Division 4, Pine Bluff Road \$1980.00
From the Chesaw road going for the first 800' of Pine Bluff, this section has never received Replenishment Gravel and it's probably the most traveled road section on the Ranch. The gravel has worn away so significantly that large base rocks stick up everywhere grossly. Use TR pit run = 3" thick x 16' wide x 800' long = (12) truck loads x \$165.00 = \$1980.00.
12. Division 4, Point Drive (south, across from Wagon Wheel) \$2475.00
From Nine Mile Road going down the first 1000' feet of road; this section among the most traveled roads on the Ranch and has never received Replenishment Gravel. Its a flat road section. TR pit run 3" thick x 16' x 1000' long = (15) truck loads x \$165.00 = \$2475.00
13. Division 7, map 2 of 2, Big Rock Road \$550.00
On the steep incline at the intersection where Big Rock continues up hill from the Outback

intersection. Not much topcoat gravel to be able to rake crown, and this spot does erode and need shaping. There is currently one full time residence traveling up that road. (2) truck loads of McNall gray shale x \$275.00 = \$550.00

14. Division 7, map 1 of 2, Horsetrail Drive \$825.00

About .45 miles from West Corral to the end of Horsetrail could use some more structurally supportive rock; it has a lot of fines and mushes up in the runoff season pretty well. There has been more-or-less the equivalent of a full time residence driving on that section for probably 20 years, and its never received any replenishment gravel either. Its a flat road section. TR pit run; 3" thick x 16' wide x 175' long = (3) loads x \$165.00 = \$495.00

15. Division 5, Mallard Drive \$550.00

About .8 miles down Mallard Drive from Nine Mile Road, coming out of the creek ravine on the steep inclined blind corner. This section has been well-traveled for Ranch history and has not received any Replenishment gravel. Further, it lacks decent topcoat gravel to be able to rake well, and this corner needs to be kept fairly smooth for cars to be able to maintain traction in the winter because its a well-traveled blind corner and is a safety hazard if a car has to abruptly stop for blind oncoming traffic (which happens fairly occasionally)... cars kinda bounce on the rough road section, even at slower speeds, but in the winter you can't crawl up the road because you'll lose traction on snow/ice. If the BOD anticipated investing in this corner for the suggested Capital Improvement item below sometime in the next 5 years I would suggest foregoing adding the gravel here because the gravel will get covered up, being a waste of money. Install McNall gray gravel 2" thick x 16' wide, two truck loads = \$550.00.

16. Division 5, Meadowlark road \$825.00

Starting approximately 800' from Mallard Drive intersection we could install some Replenishment Gravel. There are two full-time residences down that road, the Border Patrol has always traveled it well, and there's never been any added gravel placed on it. The road base is structurally good and has a lot of base rock sticking up. McNall gray gravel 2" thick x 16' wide, (3) loads = \$825.00.

XIII. Capital Improvements

The following items are large expense improvements that are not necessary to do now or soon but are on the horizon as traffic levels increase and as funds become available.

1. Division 7, map 2 of 2, West Corral Drive, "FA" \$13,690.00

This is to widen the turning radius of the switchback corner continuing up West Corral at the Gold Rush Ridge intersection. Many folks who live/recreate up that road comment how tight or impossible that corner is to drag a trailer around, and also comments about how risky it can be in the winter with ice on the corner. Lynn Barnett actually widened that spot the year after we 'took over road responsibilities' in 2000, but its still very narrow.

1. Excavate 12' deep x 100' long x 25' high using a large excavator and transport it ½ mile

away to the wideout on Gold Rush Ridge road and store it there for later fill/fines use. 1111 cu. yds. = 111 truck loads / 45 minutes per load to fill, transport and dump / \$120.00 per hour for excavator or truck = \$90.00 per load x 111 loads = \$9990.00.

2. Move and replace the existing large bolstering rocks = \$700.00 machine time.
3. Purchase and stack at least one more level of large bolstering rock to better withstand slope erosion = \$3000.

2. Division 5, Mallard Drive creek ravine \$28,545.00

Three safety and maintenance problems exist in that creek ravine: 1) the south side road is too narrow for oncoming traffic (and winter is even worse), 2) that same section has a steep tall uphill embankment that sloughs about a truck load of dirt that has to be removed from the ditch each year, and 3) the north side road has a blind corner on a steep hill that is a significant safety hazard in the winter. So far the safety issues have been manageable because traffic levels are *relatively* low, but traffic has been increasing over the years; if it keeps increasing the problems will become serious at some point.

So the prescription given by TR, prior road manager Don Coffman, and myself is to widen the south side and take that material and place it on the north side problem area – raising up the road to eliminate the steep short incline – and take out a little more of the north side uphill embankment to further widen that corner so its not 'blind' any more.

- Regarding removing the excess dirt from the south side and moving it to the north side, TR estimated \$15,000 7 years ago.
- Don Coffman estimated the same work to cost \$20,000 7 years ago.
- I have worked with TR for 20 years in private commerce and for Ranch maintenance. My experience of him regarding premeditated pricing is 1) he doesn't like to do it (demonstrates a level of insecurity) and 2) he has historically priced things on the low side.
- I worked for several years with Don Coffman also, he being a career independent road and utility builder. My experience of him was that he was more comfortable and experienced with premeditated pricing.
- So if I start with Don's \$20,000 price as statistically more reliable, and increase that by the inflation rate over seven years = \$22,200.
- Add \$2775.00 to spread 4" thick x 18' wide x 500' long gravel on the roads after all the fill and changes.
- \$450.00 for machine work to spread that gravel.
- Now add the machine time to widen the north side blind corner = remove 80' long x 8' deep x 18' high volume of dirt (427 cu.yds = (43) truck loads) = 20 minutes per load to excavate it into a truck and move it about 200' away to the flat nearby to dump it and store it for later use, @ \$120.00 per hour = \$40.00 per load x (43) = \$1720.00.
- Now add installing a culvert and ditch = \$1400.00.

3. Install check dams throughout the Ranch \$8000.00 **STAGE 2/3**

Check dams are placing rip-rap rock in strategic spots in long and steeper ditch sections in order to slow water runoff speed and turbidity so ditch and roadside erosion/undermining can be controlled. This is an industry-standard ditch/road erosion maintenance technique. The

estimate is to install (40) dams at the materials and machine cost of \$200.00 each.

- 4. Install rip-rap/large pit run in ditches to control erosion \$8000.00 **STAGE 2/3**
This is for the same reasons stated for #3 above.

There are a multitude of other possible Capital Improvement and reserve fund expenditure projects that may come to identification/need; the ones listed above are only the obvious and likely most-pressing ones. Other examples include:

- Repairs of road embankments that will be washed out because of larger seasonal runoff erosion, like on Big Rock road.
- Repair of more extreme washouts from culverts being overwhelmed occasionally.
- Additional culverts identified as desired.
- Increased traffic, and how that will cost more in gravel erosion and widening of unsafe stretches for oncoming traffic.

XIV. Quick Budget Thoughts

- Total of all STAGE 1 items above, with 8.2% sales tax: **\$53,987.47**
- Total of all 'critical' (raking for crowning, ditch clearing, associated expenses): **\$20,671.61**
Does not include any gravel added anywhere, no deposit into reserve fund savings, and no money put toward the reserve study.
- Total needed to come under compliance with CCRs and RCWs:
 - \$53,987.47 STAGE 1 items (with \$8100 gravel replenishment, \$3357 reserve fund deposit)
 - \$14,000 for average guesstimate for professional Reserve Study, per RCWs**\$67,987.47**