UNITED STATES

DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

PLAN OF CONSERVATION OPERATIONS

LAND MANAGEMENT UNIT NO. 5

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A. SUMMARY OF APPROVED PROJECTS:

Sub-Unit No. 5:

	Project	Plan No.	Est. Cost
1.	Stock Tank No. 5-M-44	P-5-C-3	$ 553.36
2.	Stock Tank No. 5-M-58	P-5-C-2	985.51
3.	Corn Wash Contour Furrowing Area	P-5-C-1	1,592.51
4.	Loupp Flats Area	P-5-C-1	3,035.44
	Tree Planting (Little Colorado River)		
5.	Plot No. 1	P-5-C-1	199.80
6.	Plot No. 2	P-5-C-1	81.45
7.	Plot No. 3	P-5-C-1	166.65
8.	Plot No. 4	P-5-C-1	1,579.90
9.	Plot No. 5	P-5-C-1	908.65
10.	Plot No. 6	P-5-C-1	592.18
11.	Plot No. 7	P-5-C-1	540.00
		TOTAL	$10,151.85

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Sub-Unit No. 4:

Project	Plan No.	Est. Cost
12. Windmill No. 5-M-30	P-5-D-5	$ 53.99
13. Well No. 5-M-14	P-5-D-4	86.99
14. Stock Tank No. 5-M-9	P-5-D-4	736.24
15. Stock Tank No. 5-M-69A	P-5-D-4	473.40
16. *Stock Tank No. 5-M-2	P-5-D-9	1,311.80
17. Stock Tank No. 5-M-34	P-5-D-9	1,879.50
18. Stock Tank No. 5-M-62	P-5-D-9	747.33
19. Stock Tank No. 5-M-63	P-5-D-9	481.75
20. Stock Tank No. 5-M-64	P-5-D-9	165.60
21. Stock Tank No. 5-M-66	P-5-D-9	541.80
22. Stock Tank No. 5-M-65	P-5-D-9	1,093.40
23. Stock Tank No. 5-M-71	P-5-D-9	1,905.[illegible]
24. Stock Tank No. 5-M-76	P-5-D-9	2,683.87
25. *Stock Tank No. 5-M-79	P-5-D-7	883.85
26. Stock Tank No. 5-M-80	P-5-D-9	376.00
27. Stock Tank No. 5-M-135	P-5-D-9	581.55
28. **Stock Tank No. 5-M-28	P-5-D	600.00
29. Tolani Lakes Buck Pasture	P-5-D-7	917.55
30. Lower Tolani Lakes Planting Area	P-5-D-7	1,467.40
31. Lower Tolani Lakes Furrowing & Listing Area	P-5-D-7	378.00
32. Garcia Mesa Sand Dune Area	P-5-D-7 & 10	2,468.89

*Not included in sub-watershed plan. See text Page 6.
**Plans not complete. See text Page 4.

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Sub-Unit No. 4: (Cont'd.)

	Project	Plan No.	Est. Cost
	Erosion Control: (Lower Tolani Lakes)		
33.	Structures No. 1, 2 & 3	P-5-D-1 & 8	$13,985.44
34.	Structure No. 4	P-5-D	?
35.	Tolani Lakes Day School	P-5-D-5	1,081.78
36.	Silt Barrier No. 1	P-5-D-6	6,951.87
		TOTAL	$20,532.08

Sub-Unit No. 5:

37.	Stock Tank No. 5-N-78	P-5-N-4	1,303.03
38.	Stock Tank No. 5-N-22	P-5-N-2	1,295.89
39.	Stock Tank No. 5-N-26	P-5-N-3	807.37
40.	Stock Tank No. 5-N-132	P-5-N-2	798.11
41.	Sunrise Roadside Demonstration Area	P-5-N-1	452.66
		TOTAL	$ 4,619.76
		GRAND TOTAL	55,283.69

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B. SUMMARY BY TYPE OF WORK:

Sub-Unit No. 3:

Type of Work	Quantity	Est. Cost
Fencing	9.7 Miles	$ 2,713.79
Tree Planting	510. Acres	3,801.78
Contour Furrowing	1,960. Acres	1,450.50
Range Reseeding	1,960. Acres	1,862.45
Stock Tanks:		
Earth-work	2,430. cu.yds.	759.22
Masonry	9.4 cu.yds.	99.71
Spreader Fences	800. lin.ft.	84.33
	TOTAL	$10,151.83

Sub-Unit No. 4:

Fencing	25.8 Miles	$ 7,052.79
Contour Furrowing & Listing	253. Acres	242.41
*Well Maintenance		80.00
Stock Tanks:		
Earth-work	18,525. cu.yds.	6,185.85
Masonry	176. cu.yds.	1,996.55
Loose Rock	88. cu.yds.	148.80
Spreader Fence	1,000. lin.ft.	89.85
Revetment Fence	78. lin.ft.	46.80
Removing & Replacing Fence on Dam	400. lin.ft.	40.00

*Consists of moving two troughs, installing float valve, and filling in around a dug well.

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Sub-Unit No. 4 (Cont'd.)

Type of Work	Quantity		Est. Cost
Windbreak Planting	4,000.	lin.ft.	$ 112.90
Tree Planting	70.5	Acres	3,010.67
Range Reseeding	133.	Acres	423.24
Erosion Control and Waterspreading:			
Earth-work	44,680.	cu.yds.	12,301.84
Masonry	191.	cu.yds.	1,594.80
Rock & Wire Sausages	3.3	cu.yds.	11.55
Rock Check Dams	4.	Struct-ures	48.00
Spreader Fence	9,450.	lin.ft.	756.00
Gully Control			
Silt Barrier No. 1	Entire Structure		6,951.87
	TOTAL		$40,532.08

Sub-Unit No. 5:

Fencing	7.5	Miles	$ 2,512.43
Stock Tanks:			
Earth-work	8,060.	cu.yds.	2,112.54
Masonry	19.8	cu.yds.	142.65
Contour Furrowing	32.	Acres	24.00
Range Reseeding	32.	Acres	28.16
	TOTAL		$ 4,619.78
	GRAND TOTAL		$55,283.69

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C. ADDITIONAL PLANS COMPLETED:

Detailed plans and cost estimates have been made on the following water developments and given to the Indian Service for completion:

Sub-Unit No. 4 (D)

Spring No. 5-M-1		Estimated Cost	$129.10
Sub-Unit No. 5 (E)			
Shallow Dug Well	No. 5-M-17	Estimated Cost	80.40
Spring	No. 5-M-68	Estimated Cost	202.01
Spring	No. 5-M-75	Estimated Cost	54.00
		TOTAL ESTIMATED COST	$456.41
		GRAND TOTAL ESTIMATED COST	$585.51

Plans are almost complete on a second silt barrier on the Orgibi Wash above Tolani Lakes, which will probably cost about $8,000.00.

D. DEVIATIONS FROM SUB-WATERSHED PLAN:

Certain projects appear in the sub-watershed plans which were disapproved by the planning party following detailed investigations which revealed that the work previously recommended could not be justified. These projects are as follows:

1. Surface Tank No. 5-M-115 in Sub-Unit No. 6
2. Surface Tank No. 5-M-46 in Sub-Unit No. 3
3. Shallow Well No. 5-M-15 in Sub-Unit No. 4
4. Erosion control on 45 miles of old roads.

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All of the remaining projects listed in the sub-watershed plan are to be deferred until a later date, following livestock control, or are to be done by the Indian Service.

The gully head protection needed on the Jeddito and Coyote Washes must be deferred until after plans are completed on the upper watersheds in Unit No. 7.

In addition to the sub-watershed plan, the following projects were found to be in need of repair and detailed plans have been made:

Surface Tank No. 5-M-2

Surface Tank No. 5-M-79

These two tanks were damaged by floods which occurred between the time that the information for the sub-watershed plan was secured and the time that the planning party returned to Land Management Unit No. 5 to make detailed plans for construction and maintenance.

Also, detailed plans have been made for the construction of a silt barrier in the Oraibi Wash above Telami Lakes.

Detailed plans on a second silt barrier are not yet complete. The estimated costs as shown in this report are for the first part of the structures and do not include the cost estimates on those parts of the structures which are to be built in successive years. The completion of a silt barrier structure may require as much as five years since only one part of it is built each year.

In the sub-watershed plan, range improvements Nos. 5-M-132 and 133 are recommended drilled wells. A study of the geology reveals that water cannot be obtained at these locations at a reasonable depth. Therefore, a tank has been built and substituted for proposed Well No. 5-M-132. No tank site could be found to take the place of the proposed Well No. 5-M-133, so that no development has been made at this location. Development 5-M-134 is a recommended surface tank. Detailed investigations revealed the presence of an Indian dug shallow well one mile south of this location which furnishes ample livestock water for this area, eliminating need for further development.

A brief study of the silt and erosion problem at Tolami Lakes Farming Area was made and although this project is in very good condition at the present time, its stability is dependent upon silt retention and water conservation in Units Nos. 4 and 6. Great quantities of silt and large floods are a menace to the project. Further plans for subjugation, windbreaks, erosion control, etc., will have to be deferred until control is secured on the upper watershed.

B. NARRATIVE DESCRIPTION:

JUSTIFICATION:

Sub-Unit No. 1:

No Structural Treatment

Sub-Unit No. 2:

No Structural Treatment

Sub-Unit No. 3:

Stock Tank No. 5-M-44:

Desilting plot needed to insure a vegetative cover on watershed and decrease silting of tank. Area serviced 6,320 acres.

Carrying capacity 280 S. U.

Stock Tank No. 5-M-58:

Deepening will increase storage capacity and furnish livestock water so as to prevent trailing to stock tank No. 5-M-55. Repair of dyke to divert water into tank and stop a series of gullies. Spreader fence necessary to retard silt now going into tank and to stop the progress of "finger" gullies on the area above.

Area serviced 5,000 acres. Carrying capacity 96 S. U.

F. W: 556

Sub-Unit No. 3: (Cont'd.)

Corn Wash Contour Furrowing Area:

This area is being destroyed by small lateral gully fingers caused by local run-off into Corn Wash. Vegetation is very sparse and the slopes are gentle. The soils vary from sandy loam to clay and clay loam. Contour furrowing will increase water penetration and decrease run-off and stop small gully heads and finger gullies which are destroying the land. Reseeding should increase the carrying capacity and further retard run-off and erosion.

Leupp Flats Area:

This area is fairly representative of approximately 85,000 acres of clay and clay loam rangeland in Unit No. 5 which have a dense surface soil, high salt content and poor physical condition. The results of the prescribed treatment on this area would be comparable to that which might be expected on the remaining area of similar rangeland in this Unit.

The treatment is designed to conserve water which now runs off into the Little Colorado River by effecting moisture penetration on the heavy clay soils. The increased soil moisture content and reseeding should increase the carrying capacity of the browse type from approximately five sheep per section to approximately fifteen sheep per section.

Sub-Unit No. 3: (Cont'd.)

Tree Planting (Little Colorado River):

494 acres have been selected as tree planting sites. 142 acres are to be fenced and eighty acres is an extension of previous plantings and will not have to be fenced.

These plantings are for the purpose of flood control, erosion control, bank stabilization, silt retention and fuel.

The following trees will be required:

Cottonwood	47,430
Chinese elm	47,430
Honey locust	23,715
Black locust	23,715
New Mexico locust	11,857
Russian olive	11,857
Silver poplar	11,857
American elm	11,857
Willow	11,857
Mulberry	11,857
Total	213,432

Some changes in the number and species of trees planted may be desirable. The cost estimates used are based upon the average costs of previous plantings.

F. W. 558

Sub-Unit No. 4:

Well No. 5-M-30:

The present trough is not adequate to serve the stock watering here; the float valve is out of order and is too small. Repairing and altering the watering trough below the windmill and storage tank will put into use two 18 foot sections of trough near the well but now not connected to water. A larger float valve is needed to take care of the proposed systems of troughs.

Area serviced 8,860 acres. Carrying capacity 164 S. U.

Well No. 5-M-14:

Filling in around well and trough will prevent erosion damage to the development.

Area serviced 7,000 acres. Carrying capacity 374 S. U.

Well No. 5-M-9:

Cleaning this tank will increase the storage capacity making water available to livestock and relieving livestock concentrations at Red Lake Trading Post and at Well No. 5-M-14.

Contour furrowing will hasten revegetation on the watershed and stop silting. Recommended spacing of furrows - 5 ft. maximum.

Construction of spreader fences on a grade will aid silt deposition and turn water into the tank.

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Sub-Unit No. 4: (Cont'd.)

Well No. 5-M-9: (Cont'd.)

Area serviced 3,915 acres. Carrying capacity 90 S. U.

Well No. 5-M-69A:

Deepening this structure will increase the storage capacity so as to furnish water for the range to the north, eliminating trailing across the Lower Tolani Lakes saceton flat to Well No. 5-M-14.

Stock Tank No. 5-M-2:

This tank overtopped and is ready to wash out. Serves 5,000 surface acres with a carrying capacity of 150 sheep units.

Stock Tank No. 5-M-34:

This tank failed by overtopping. It needs to be repaired and spillway built. A desilting plot is needed above tank. Serves 7,163 surface acres with carrying capacity of 154 S. U.

Stock Tank No. 5-M-62:

Needs cleaning out to increase capacity and needs desilting plot to help retain silt above. Serves 4,100 surface acres with carrying capacity of 171 S. U.

Stock Tank No. 5-M-63:

This tank needs to be built up to increase capacity; mechanical structures are needed to stabilize spillway. Serves 3,000 surface acres with carrying capacity of 75 S. U.

F. W.: 560

Sub-Unit No. 4: (Cont'd.)

Stock Tank No. 5-M-64:

Trees planted in the desilting plot above this tank are surviving. Planting additional 2 acres will aid in causing silt deposition above tank. Serves 4,000 surface acres with carrying capacity of 115 S. U.

Stock Tank No. 5-M-66:

Desilting plot is needed to slow up rate of silting on this tank. Serves 3,750 surface acres with carrying capacity of 94 S. U.

Stock Tank No. 5-M-65:

Erosion control work in gullies in desilting plot above tank and planting two acres of trees will greatly lessen the amount of silt being deposited in the tank. Serves 4,725 surface acres with carrying capacity of 180 S. U.

Stock Tank No. 5-M-71:

This tank needs to be deepened to increase the capacity, and a dyke to divert water into it needs to be repaired. A desilting plot is needed. E.C.W. has fenced the water; this is now in bad shape. Posts and wire from this should be salvaged and used on plot. Serves 4,070 surface acres with carrying capacity of 184 S. U.

Sub-Unit No. 4: (Cont'd.)

Stock Tank No. 5-M-76:

1,217 rods of fence required to enclose 430 acre desilting plot above Stock Tank 5-M-76. There will be about 15.5 acres of streambed planting in this area. The following trees are recommended:

Trees	Acres	Spacing	No. of Trees
Tamarisk	4	3 x 3	19,360
Willow	4	3 x 3	19,360
Sand Plum	1.5	3 x 3	7,260
Honey Locust	6	10 x 10	2,610
Total	15.5		48,590

The Tamarisk and Willow should be planted where the channel is wide and the water does not concentrate. The Honey Locust and Sand Plum should be planted on the higher ground.

Repair of diversion dyke needed.

This planting will serve as a desilting plot, and as a streambed planting. Trees planted in this area will check the silt accumulation in Stock Tank No. 5-M-76 and on the new farm on the southeast side of the wash.

Stock Tank No. 5-M-79:

This tank overtopped and is ready to wash out. Serves 4,000 surface acres with a carrying capacity of 240 S. U. Will relieve livestock pressure on Tanks Nos. 5-M-73 and 5-M-1.

Sub-Unit No. 4: (Cont'd.)

Stock Tank No. 5-M-80:

Desilting plot on this development will aid in silt deposition above tank. Serves 5,000 surface acres with carrying capacity of 120 S. U.

Stock Tank No. 5-M-135:

Work consists of building a diversion dyke to put water into a natural lake. Serves 4,750 surface acres with a carrying capacity of approximately 225 S. U.

Stock Tank No. 5-M-28:

Work consists of replacing diversion dyke and repairing spillway. Serves 2,400 surface acres. Carrying capacity 40 S. U. Will help relieve trailing to stock water at Red Lake Trading Post and to stop Tank No. 5-M-27.

Tolani Lakes Buck Pasture:

Active cutting heads, approximately 5 ft. deep, are working up a small swale and galleta valley. Between this head and the pasture fence are a number of shallow channels. These will work beyond the fence unless treated. A drop structure will stop the progress of the heads; spreader fences will prevent concentrations of water in these channels, allowing them to heal. Contour furrowing at an average interval of

Sub-Unit No. 4: (Cont'd.)

Tolani Lakes Buck Pasture: (Cont'd.)

10 feet along the side slopes will retain normal precipitation where it falls. This treatment will affect approximately 376 acres.

Small gully heads are working into this area and channels are starting above them. Rock check dams will allow the heads to heal and spreader fences will effect stabilization of the small channels. Contour furrowing at an average interval of 10 feet on the side slopes will help retain moisture where it falls. Care must be taken to reach the top of the slope with the top furrow. 67 acres are affected by this treatment.

There is a sheet movement of water from a small watershed of approximately 50 acres of galleta rangeland with a sandy loam and clay loam soil, located entirely within the fenced area. Contour furrowing the upper 30 acres at a 10 ft. average interval should retain all the precipitation on the area and prevent potential gullying below.

This is a barren area to the leeward of a sandy area. Solid listing with damming lister should conserve the water falling on it and fill with blowing sand, thereby affording a more suitable seedbed and aid revegetation.

F. W. : 564

Sub-Unit No. 4: (Cont'd.)

Tolani Lakes Buck Pasture: (Cont'd.)

Tank No. 5-M-20 is silting rapidly. Planting approximately one acre in the channel and along sand bars above the tank will, by causing meandering, slow up the velocity of the water and deposit silt.

1/2 acre:

Willow	600
Tamarisk	600

1/2 acre:

Forestiera	50
Russian Olive	100
N. M. Locust	100
Total	1610

Lower Tolani Lakes Planting Area:

The 57 acres to be planted are divided into 3 areas:

Area No. 1 - 9 Acres - 1½ miles long & 50' wide.

Area No. 2 - 30 " - 5 " " " " "

Area No. 3 - 18 " - 3 " " " " "

After the water is diverted from the channel it will be possible to plant in the bed of the wash. The channel bed varies in width, and there are rock outcrops in areas Nos. 2 and 3. The water table is high and plant roots will reach it after the first season's growth.

The clover should be broadcast in favorable places through the length of the planting areas.

Sub-Unit No. 4: (Cont'd.)

Lower Tolani Lakes Planting Area: (Cont'd.)

Fifty acres are to be planted to trees and approximately 7 acres to yellow sweet clover.

Honey Locust	5,000
Chinese Elm	5,000
Black Locust	2,500
Russian Olive	2,500
Mulberry	1,250
Cottonwood	2,500
Ash	1,250
Willow	25,000
Plum	2,500
Tamarisk	25,000
Total	72,500

Yellow Sweet Clover ------ 175 lbs.

Some change in the number and species of trees planted may be necessary. The cost estimates used are based upon the average costs of previous plantings.

These plantings are for the purpose of erosion control, silt retention, and fence posts.

Lower Tolani Lakes Furrowing & Listing Area:

This area is subject to the same degree of livestock control as the rest of the Lower Tolani Lakes Area.

The accompanying map shows the plots and proposed treatment for each plot. Soil samples were taken at various locations as shown on the map. The soil profiles are as follows:

Sub-Unit No. 4: (Cont'd.)

Lower Tolani Lakes Furrowing & Listing Area: (Cont'd.)

Station No. 2 - 0" to 6" ---- clay
6" to 42" ---- loose sand
7 - 0" to 12" ---- clay
12" to 22" ---- sand
22" to 36" ---- clay
8 - 0" to 14" ---- clay
14" & ---------- sand
9 - All Clay
12 - 0" to 12" ---- clay
12" to 30" ---- sand
30" and down -- clay
13 - 0" to 12" ---- clay
12" to 22" ---- hard sand
22" to 36" ---- clay

The proposed seeding on Plots Nos. A, B and D is 12 lbs. per a , and on Plot No. C, 24 lbs. per acre of the following seed mixture:

Alkali Sacaton	3 lbs.
Chamise	3 "
Bluestem	3 "
Wild Sunflower or chanepodium	1 "
Shadscale	2 "

Broadcast 12 lbs. per acre of the above seed mixture on Plot B after it is plowed.

Garcia Mesa Sand Dune Area:

It is necessary to fence 4,800 acres to effect stabilization of 1,400 acres of active moving sand-dunes. These dunes are moving across valuable range-land.

Head cutting through the spillway of Tank 5-M-79 will drain the tank unless checked.

The wash deposits considerable silt in the tank. Planting its streambed for a distance of one-half mile for an average width of 2 rods will slow up the current

Sub-Unit No. 4: (Cont'd.)

Garcia Mesa Sand Dune Area: (Cont'd.)

and cause it to meander, thereby depositing the coarser silt above the tank. Some changes in the species are recommended:

Tamarisk	2,400
Willow	2,400
Chinese Elm	100
Honey Locust	100
Russian Olive	100
Cottonwood	100
Forestiera	100
Total	5,300

Erosion Control (Lower Tolani Lakes):

Structures Nos. 1, 2, 3 & 4:

This project is for the protection of approximately 10,000 acres of sacaton flats being destroyed by deep gully heads, by the construction of four major diversion dykes. Present carrying capacity is approximately 400 S. U. With the proper spreading of water, there is a possibility of increasing the carrying capacity and developing approximately 200 acres of hay land.

Tolani Lakes Day School:

This project consists of erosion control on approximately 80 acres. Severe wind erosion is damaging the Tolani Lakes Day School. Also this area will be used as a demonstration area.

Treatment will consist of fencing the area, requiring 580 rods of fence, planting of 5,400 ft. of

Sub-Unit No. 4: (Cont'd.)

Tolani Lakes Day School: (Cont'd.)

wind-breaks, and range reseeding of approximately 60 acres.

Silt Barrier No. 1:

This project is approximately five miles above the present Tolani Lakes diversion dam. The purpose of this structure is silt retention, desiltation of streams used for irrigation of Tolani Lakes spreading area, and eventual water spreading on approximately 4,000 acres of rangeland.

Sub-Unit No. 5:

Stock Tank No. 5-M-78:

Rebuilding of an Indian tank to furnish stockwater west of the Dinnebito and relieve livestock concentration at stockwaters Nos. 5-M-75, 76 and 135. Desilting plot necessary to insure permanency of the structure.

Area serviced 4,730 acres. Carrying capacity 167 S. U.

Sub-Unit No. 5: (Cont'd.)

Stock Tank No. 5-M-22:

This tank needs to be deepened and repaired so as to furnish water for livestock on the range area between Newberry Mesa and the Little Colorado River. Desilting plot is needed to insure vegetation and help retain silt.

Area serviced 4,470 acres. Carrying capacity 184 S. U.

Stock Tank No. 5-M-26:

This tank needs to be deepened and repaired so as to furnish water for livestock on the range area between Newberry Mesa and the Little Colorado River. Desilting plot is needed to insure vegetation and help retain silt.

Area serviced 9,000 acres. Carrying capacity 154 S. U.

Stock Tank No. 5-M-132:

Deepening and building up of an old Indian tank to furnish water for livestock on the range area between the Little Colorado River and Dinnebito Wash. Desilting Plot needed to help retain silt.

Area serviced 9,440 acres. Carrying capacity 497 S. U.

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Sub-Unit No. 5: (Cont'd.)

Sunrise Roadside Demonstration Area:

This area is located on range land which is being destroyed by wind erosion accelerated by trampling and overgrazing. Most of the friable, sandy loam top soil has been removed, leaving the hard, highly dispersed sub-soil exposed. Vegetation cannot get a start on this sub-soil and some treatment is needed to start the build-up of soil for a seed-bed. In order to collect some of the sand that now blows across the area, 16 acres have been recommended for furrowing at 6 ft. intervals at right angles to the prevailing wind direction with a mold-board plow and seeded with 5 pounds of the following seed mixture per acre:

Alkali Sacaton ------ 2 lbs.
Chamise ---------- 3 lbs.

The remaining 16 acres of furrowing to be done with contour furrower. Furrows to be 6 ft. apart and seeded as outlined above.

No detailed plans will be submitted on this project at this time because of sufficient information previously furnished.