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Appendix

A. Cass County Soil Series (U.S. Department of Agriculture 1983, 85-110)

Barnes Series

"The Barnes series consists of deep, well drained, moderately slowly permeable soils on glacial tills plains. The soils formed in medium textured or moderately fine textured glacial till. The slope ranges from 0 to 25 percent" (85).

Buse Series

"The Buse series consists of deep, well drained, moderately slowly permeable soils on glacial till plains. The soils formed in medium textured or moderately fine textured glacial till. The slope ranges from 3 to 35 percent" (87).

Cashel Series

"The Cashel series consists of deep, somewhat poorly drained, moderately slowly permeable soils on flood plains. The soils formed in fine textured alluvium. The slope is 0 to 1 percent" (87).

Colvin Series

"The Colvin series consists of deep, poorly drained, moderately slowly permeable soils on glacial lake plains and in outwash channels. The soils formed in medium textured and moderately fine textured lacustrine sediment and in alluvium. The slope is 0 to 1 percent" (88).

Divide Series

"The Divide series consists of deep, somewhat poorly drained soils that are moderately permeable in the upper part and very rapidly permeable in the lower part. They are on glacial outwash plains and between beach ridges. The soils formed in medium textured material overlying coarse textured glacial outwash sediment. The slope is 0 to 1 percent" (89).

Dovray Series

"The Dorvay series consists of deep, very poorly drained, slowly permeable soils on glacial lake plains. The soils formed in fine textured lacustrine sediment. The slope is 0 to 1 percent" (89).

Embden Series

"The Embden series consists of deep, moderately well drained, moderately rapidly permeable soils on glacial lake plain and glacial outwash plains. The soils formed in medium textured glacial outwash sediment and glacial lake sediment. The slope ranges from 1 to 6 percent" (90).

Emrick Series

"The Emrick series consists of deep, well drained, moderately permeable soils on glacial till plains. The soils formed in medium textured glacial till. The slope ranges from 1 to 6 percent" (90).

Enloe Series

"The Enloe series consists of deep, poorly drained, slowly permeable soils on glacial lake plains. The soils formed in fine textured lacustrine sediment. The slope is 0 to 1 percent" (91).

Esmond Series

"The Esmond series consists of deep, well drained, moderately permeable soils on glacial till plains. The soil formed in medium textured and moderately coarse textured glacial till. The slope ranges from 6 to 15 percent" (92).

Fairdale Series

"The Fairdale series consists of deep, moderately well drained, moderately permeable soils on flood plains. The soils formed in medium textured and moderately coarse textured alluvium. The slope ranges from 1 to 3 percent" (92).

Fairdale Variant

"The Fairdale Variant consists of deep, moderately well drained, slowly permeable soils on flood plains. The soils formed in medium textured alluvium overlying fine textured lacustrine sediment. The slope is 0 to 1 percent" (93).

Fargo Series

"The Fargo series consists of deep, poorly drained, slowly permeable soils, on glacial lake plains. The soils formed in fine textured lacustrine sediment. The slope ranges from 0 to 3 percent" (94).

Galchutt Series

"The Galchutt series consists of deep, somewhat poorly drained, slowly permeable soils on glacial lake plains. The soils formed in medium textured material overlying fine textured lacustrine sediment. The slope is 0 to 1 percent" (95).

Gardena Series

"The Gardena series consists of deep, moderately well drained, moderately permeable soils on glacial lake plains. The soils formed in medium textured lacustrine sediment. The slope ranges from 0 to 3 percent" (95).

Hamerly Series

The Hamerly series consists of deep, somewhat poorly drained, moderately slowly permeable soils on glacial till plains. The soils formed in medium textured glacial till. The slope ranges from 0 to 6 percent" (97).

Hegne Series

"The Hegne Series consists of deep, poorly drained, very slowly permeable soils on glacial lake plains. The soils formed in fine textured lacustrine sediments. The slope is o to 1 percent" (97).

Heimdal Series

"The Heimdal series consists of deep, well drained, moderately permeable soils on glacial till plains. The soils formed in medium textured and coarse textured glacial till. The slope ranges from 1 to 15 percent" (98).

LaDelle Series

"The LaDelle series consists of deep, moderately well drained, moderately permeable soils on flood plains. The soils formed in medium textured and moderately fine textured alluvium. The slope is 0 to 1 percent" (98).

Lamoure Series

"The Lamoure series consists of deep, poorly drained, moderately permeable soils on flood plains. The soils formed in medium textured alluvium. The slope is 0 to 1 percent" (99).

Lindaas Series

"The Lindaas series consists of deep, poorly drained, slowly permeable soils on glacial lake plains. The soils formed in medium textured and moderately fine textured lacustrine sediment. The slope is 0 to 1 percent" (99).

Maddock Series

"The Maddock series consists of deep, well drained, rapidly permeable soils on glacial lake and delta plains. The soils formed in coarse textured, water-deposited sediment. The slope ranges from 1 to 6 percent" (100).

Nahon Series

"The Nahon series consists of deep, moderately well drained, very slowly permeable, alkali (sodic) soils on glacial lake plains. The soils formed in moderately fine textured and medium textured lacustrine sediment. The slope ranges from 0 to 2 percent" (100).

Nutley Series

"The Nutley series consists of deep, well drained, slowly permeable soils on glacial lake plains. The soils formed in fine textured and moderately fine textured lacustrine sediment. The slope ranges from 3 to 9 percent" (101).

Overly Series

"The Overly series consists of deep, moderately well drained, moderately slowly permeable soils on glacial lake plains. The soils formed in moderately fine textured lacustrine sediment. The slope range from 0 to 6 percent" (102).

Parnell Series

"The Parnell series consists of deep, very poorly drained, slowly permeable soils on glacial till plains. The soils formed in medium textured and moderately fine textured alluvium from glacial drift. The slope is 0 to 1 percent" (102).

Perella Series

"The Perella series consists of deep, somewhat poorly drained and poorly drained, moderately slowly permeable soils on glacial lake plains. The soils formed in medium and moderately fine textured lacustrine sediments. The slope is 0 to 1 percent" (103).

Rauville Series

"The Rauville series consists of deep, very poorly drained, moderately slowly permeable soils on the flood plains. The soils formed in stratified, moderately fine textured to coarse textured alluvium. The slope is 0 to 1 percent" (103).

Renshaw Series

"The Renshaw series consists of deep, somewhat excessively drained, rapidly permeable soils that are shallow over sand and gravel. They are on glacial outwash plains. The soils formed in medium textured alluvium over sand and gravel. The slope ranges from 1 to 6 percent" (104).

Ryan Series

"The Ryan series consists of deep, poorly drained, very slowly permeable, alkali (sodic) soils on glacial lake plains. The soils formed in fine textured lacustrine sediments. The slope is 0 to 1 percent" (104).

Sioux Series

"The Sioux series consists of deep, excessively drained, rapidly permeable soils that are very shallow over sand and gravel. They are on glacial outwash plains and beach ridges. The soils formed coarse textured glacial outwash. The slope ranges from 1 to 15 percent" (105).

Svea Series

"The Svea series consists of deep, moderately well drained, moderately slowly permeable soils on glacial till plains. The soils formed in medium textured glacial till. The slope is 0 to 6 percent" (105).

Tiffany Series

"The Tiffany series consists of deep, poorly drained, moderately permeable soils on deltas, on glacial lake plains, and on glacial outwash plains. The soils formed in medium textured to coarse textured glacial outwash sediment and lacustrine sediment. The slope is 0 to 1 percent" (106).

Tonka Series

"The Tonka series consists of deep, poorly drained, slowly permeable soils on glacial till plains. The soils formed in local alluvium and medium textured and moderately fine textured glacial till. The slope is 0 to 1 percent" (107).

Vallers Series

"The Vallers series consists of deep, poorly drained, moderately slowly permeable soils on glacial till plains. The soils formed in moderately fine textured and medium textured glacial till. The slope is 0 to 1 percent" (107).

Wahpeton Series

"The Wahpeton series consists of deep, moderately well drained, moderately slowly permeable soils on flood plains and on terraces. The soils formed in fine textured alluvium. The slope is 0 to 1 percent" (108).

Wyard Series

"The Wyard series consists of deep, somewhat poorly drained, moderately permeable soils on glacial till plains. The soils formed in medium textured local alluvium and in glacial till. The slope ranges from 1 to 3 percent" (109).

Wyndmere Series

"The Wyndmere series consists of deep, somewhat poorly drained, moderately rapidly permeable soils on glacial lake plains. The soils formed in moderately coarse textured, coarse textured, and medium textured lacustrine sediments. The slope ranges from 0 to 6 percent" (109).

Rural Subdivision Survey- Land Owner/Farm Operator

Dear Land Owner or Farm Operator:

Cass County is in the process of updating the county's Comprehensive Plan and will shortly after begin updating the county's Subdivision Ordinances. The Comprehensive Plan can be thought of as the blueprint for the future growth and development of the county and the Subdivision Ordinances are the tools to implement this blueprint or plan. The end goal of updating the comprehensive plan is to create policies which will shape the future development of the county. Public input is crucial element of the Comprehensive Planning process; as a result the county respectfully requests your input regarding your experiences as a land owner/operator in close proximity to rural subdivisions which will be used to help update Cass County's Comprehensive Plan.

This survey is being sent to all land owners within three-quarters of a mile of the rural subdivisions surrounding metro area. The information gathered from the surveys will only be used to help update Cass County's Comprehensive Plan and Subdivision Ordinances. The survey does not require any personal information and any provided will not be published or shared. The county only asks you to answer the questions based on you're experiences as a land owner/farm operator surrounding a rural subdivisions. The goal of the survey is to find out how rural subdivisions affect farm land owners/operators in order to determine how the county's subdivision policies could be changed to make rural subdivisions more compatible with the surrounding agricultural land.

Please return the survey in the included post paid envelope. Any questions or comments can be directed to Mike Zimney at (701) 298-2375 or zimneym@co.cass.nd.us.

1. The rural subdivision in close proximity to your land: _____
   If you do not know the subdivision name please provide the section and township:
   _____

2. Did you own/rent this land prior to the construction of this subdivision?
   - ☐ Yes
   - ☐ No

3. What is your land surrounding the subdivision currently used for?
   - ☐ Farming
   - ☐ Ranching
   - ☐ Vacant
   - ☐ Other: _____

Questions 3-13 should be answered only in regards to your experiences for your land near the subdivision.

3. Experienced trampling of crops (from residents, horses, vehicles, ATV's, etc.)
   - ☐ No problem
   - ☐ Slight problem
   - ☐ Major problem

4. Experienced trash or litter on land from the subdivision
   - ☐ No problem
   - ☐ Slight problem
   - ☐ Major problem

5. Experienced crop losses due to storm water runoff from subdivision
   - ☐ No problem
   - ☐ Slight problem
   - ☐ Major problem

6. Experienced damaged drain tiles or ditches
   - ☐ No problem
   - ☐ Slight problem
   - ☐ Major problem

7. Experienced vandalism of farm fences or buildings
   - ☐ No problem
   - ☐ Slight problem
   - ☐ Major problem

8. Experienced vandalism of farm equipment or vehicles
   - ☐ No problem
   - ☐ Slight problem
   - ☐ Major problem

9. Experienced subdivision residents planting gardens, shrubs, or trees on your land
   - ☐ No problem
   - ☐ Slight problem
   - ☐ Major problem

10. Experienced injury to livestock as result of subdivision's residents or pets
    - ☐ No problem
    - ☐ Slight problem
    - ☐ Major problem

11. Experienced theft of property

- ☐ No problem
- ☐ Slight problem
- ☐ Major problem

12. Experienced greater inconveniences or challenges in moving equipment or product near the subdivision

- ☐ No problem
- ☐ Slight problem
- ☐ Major problem

12. Have had to alter or change chemical spraying near the subdivision

- ☐ Yes
- ☐ No

13. Received complaints from subdivision residents for normal farming activities

- ☐ No
- ☐ Yes↓

If yes, what were the complaints?

- ☐ Dust from trucks or equipment
- ☐ Noise of equipment
- ☐ Odors
- ☐ Chemical spraying
- ☐ Long hours of operation during harvest or planting
- ☐ Other: _____

14. Do you own agricultural land not near (3+ miles) a rural subdivision?

- ☐ No
- ☐ Yes↓

If yes, would you say the problems outlined in questions 3-13 happen more often near rural subdivisions?

- ☐ Yes
- ☐ No

15. Please check the statement that best applies to yourself as a land owner/operator near a rural subdivision:

- ☐ The rural subdivision has made for a better experience
- ☐ The rural subdivision has resulted in no change
- ☐ The rural subdivision has created more problems and issues.

16. Please use the following area to express any concerns, comments, or suggestions you have regarding this issue:

_____

Thank you very much for your help

CASS COUNTY GOVERNMENT

Farmer and Rancher Survey Results			
Question	Sum	Ratio	Percentage
2. Was land owned prior to subdivision			
Yes	38	38/50	76.00%
No	12	12/50	24.00%
3. What is your land used for			
Farming	52	52/52	100%
Ranching	0	0/52	0%
Vacant	0	0/52	0%
4. Experienced crop trampling			
No problem	29	29/50	58.00%
Slight problem	17	17/50	34.00%
Major problem	4	4/50	8.00%
5. Experienced trash or litter on land			
No problem	25	25/50	50.00%
Slight problem	17	17/50	34.00%
Major problem	8	8/50	16.00%
6. Experienced damage due to water runoff			
No problem	44	44/50	88.00%
Slight problem	5	5/50	10.00%
Major problem	1	1/50	2.00%
7. Experienced damaged drain tile or drains			
No problem	42	42/50	84.00%
Slight problem	6	6/50	12.00%
Major problem	2	2/50	4.00%
8. Experienced vandalism of property			
No problem	43	43/50	86.00%
Slight problem	6	6/50	12.00%
Major problem	1	1/50	2.00%
9. Experienced vandalism of equipment			
No problem	39	39/50	78.00%
Slight problem	8	8/50	16.00%
Major problem	3	3/50	6.00%
10. Experienced planting of veg. on land			
No problem	47	47/50	94.00%
Slight problem	3	3/50	6.00%
Major problem	0	0/50	0.00%
11. Experienced injury to livestock			
No problem	48	48/50	96.00%
Slight problem	2	2/50	4.00%
Major problem	0	0/50	0.00%
12. Experienced theft of property			
No problem	37	37/50	74.00%
Slight problem	13	13/50	26.00%
Major problem	0	0/50	0.00%
13. Experienced problems moving equip.			
No problem	35	35/50	70.00%
Slight problem	13	13/50	26.00%
Major problem	2	2/50	4.00%
14. Had to alter chemical spraying			
Yes	16	16/49	32.65%
No	33	33/49	67.35%

15. Received complaints for farming activities			
No	44	44/49	89.80%
Yes	5	5/49	10.20%
If yes, what were the complaints			
Dust	2	2/5	40.00%
Noise from equipment	1	1/5	20.00%
Odors	2	2/5	40.00%
Chemical spraying	0	0/5	0.00%
Long work hours			
16. Own Ag land not near subdivisions			
No	22	22/51	43.14%
Yes	29	29/51	56.86%
If yes, these problems more common near subdivisions			
Yes	15	15/27	55.56%
No	12	12/27	44.44%
17. Check which applies			
Subdivision made for better experience	6	6/50	12.00%
Subdivision made for same experience	27	27/50	54.00%
Subdivision made for worse experience	17	17/50	34.00%

C. Rural Subdivision Survey Information

Rural Subdivision Survey-Residents

Dear Homeowner:

Cass County is in the process of updating the county's Comprehensive Plan and will shortly after begin updating the county's Subdivision Ordinances. The Comprehensive Plan can be thought of as the blueprint for the future growth and development of the county and the Subdivision Ordinances are the tools to implement this blueprint or plan. The end goal of updating the comprehensive plan is to create policies which will shape the future development of the county. Public input is crucial element of the Comprehensive Planning process; as a result the county respectfully requests your input regarding your experiences living in a rural subdivision; input which will be used to help update Cass County's Comprehensive Plan.

This survey is being sent to all the residents living in the rural subdivisions surrounding the West Fargo/Fargo metro area. The information gathered from the surveys will only be used to help update Cass County's Comprehensive Plan and Subdivision Ordinances. The survey does not require any personal information and any provided will not be published or shared. The county only asks you to answer the questions based on your experiences living within your current subdivision. This information will be used to help guide the county's update of the subdivision ordinances to hopefully create the best possible experiences for residents of future rural subdivisions.

Please return the survey in the included post paid envelope. Any questions or comments can be directed to Mike Zimney at (701) 298-2375 or zimneym@co.cass.nd.us

1. The Subdivision you currently reside in:_____

2. Where did you previously reside:

- ☐ In Cass County
  - ☐ Metro Area (Fargo/West Fargo)
  - ☐ One of Cass County's other cities
  - ☐ A different rural subdivision
  - ☐ A rural home not part of a larger rural subdivision
- ☐ Outside of Cass County
  - ☐ Large city (100,000+)
  - ☐ Medium sized city (15,000-100,000)
  - ☐ Smaller city (under 15,000)
  - ☐ A rural subdivision
  - ☐ A rural home not part of a larger rural subdivision

3. Length of time you have lived in your current subdivision:

- ☐ Less than one year
- ☐ One to three years
- ☐ Three to eight years
- ☐ Eight or more years

4. Why did you choose to live in this subdivision (check all that applies)?

- ☐ More affordable land
- ☐ Larger lots
- ☐ More lot or construction options
- ☐ Fewer restrictions
- ☐ Ability to have horses or other animals
- ☐ "Rural" atmosphere
- ☐ Lower taxes
- ☐ Lower cost of living
- ☐ Distance yourself from the Fargo/West Fargo area

5. Check all that applies to your subdivision:

- ☐ Roads within subdivision are gravel
- ☐ Roads within subdivision are privately owned and maintained
  - ☐ Don't know
- ☐ The township or county roads servicing subdivision are gravel
- ☐ Subdivision uses open ditches for storm water
- ☐ Subdivision uses an underground storm water system
- ☐ Subdivision uses wells
- ☐ Subdivision uses rural water
- ☐ Subdivision uses city water
- ☐ Subdivision uses on-site septic systems
- ☐ Subdivision uses a central sanitary sewer system

6. If you at one time lived within an urban area, what aspects do most miss (check all that applies)?

- ☐ Paved Roads
- ☐ Publicly owned and maintained roads
- ☐ Central sanitary sewer system
- ☐ Underground storm water system
- ☐ Proximity to the metro area
- ☐ Sidewalks, bike paths, or walking trails
- ☐ Open space and parks
- ☐ Street trees
- ☐ Street lights
- ☐ Closer proximity to Fire, Police, and Emergency services
- ☐ Other: _____

7. What aspects of your rural subdivision do dislike?

- ☐ Quality of roads within the subdivision
- ☐ Quality of public roads servicing the subdivisions
- ☐ On site septic systems
- ☐ The open ditches
- ☐ Truck traffic from farming operations
- ☐ Dust/chemical spraying from surrounding farms
- ☐ Noise from surrounding farms
- ☐ Odors from surrounding farms
- ☐ Other:_____

8. Has the access to your subdivisions ever been temporally blocked due to flood waters?

- ☐ No
- ☐ Yes ↓
  - A. If yes, was it a concern for you or your family's safety?
    - ☐ Yes
    - ☐ No

9. Would you prefer the roads within your subdivision were paved?

- ☐ No
- ☐ Yes ↓
  - A. If yes, would you still be in favor of paved roads if this meant increase in your personal expense?
    - ☐ No
    - ☐ Yes ↓
      - B. If yes, what option would you prefer?
        - ☐ Roads paved by developer during construction of the subdivision and this cost figured into the lot prices.
        - ☐ Roads paved after the residents have moved in and paid by the residents or home owners association.
          - C. What would be willing to pay for the cost of the road?
            - ☐ $0-2,000
            - ☐ $2,001-4,000
            - ☐ $4,001-6,000
            - ☐ $6,000+

10. Please rate your experience with your subdivisions roads:

- ☐ Good
- ☐ Neutral
- ☐ Bad

11. If you have open ditches, please rate your overall experience:

- ☐ Good
- ☐ Neutral
- ☐ Bad

12. Please rate your overall experience with your subdivision:

- ☐ Good
- ☐ Neutral
- ☐ Bad

13. Please use the following area to express any concerns, comments, or suggestions you have regarding rural subdivisions or county planning:

Thank you very much for your help

CASS COUNTY GOVERNMENT

Rural Subdivision Survey Results			
Question	Sum	Ratio	Percentage
2. Location of your previous residence			
Cass County	458	458/579	79.10%
Metro area	376	376/458	82.10%
City	19	19/458	4.15%
Rural subdivision	44	44/458	9.61%
Rural home	14	14/458	3.06%
Outside of Cass County	121	121/579	20.90%
Large city	26	26/121	21.49%
Medium city	42	42/121	38.02
Small city	19	19/121	15.70
Rural subdivision	16	16/121	13.22
Rural home	25	25/121	20.66
3. Length of time in current home			
Less than a year	17	17/563	3.02%
1-3 years	95	95/563	16.87%
3-8 years	171	171/563	30.37%
8+ years	280	280/563	49.73%
4. Reasons for choosing subdivision			
More affordable land	231	231/568	40.67%
Larger lots	506	506/568	89.08%
More lot/construction options	91	91/568	16.02%
Fewer restrictions	254	254/568	44.72%
Ability to have animals	52	52/568	9.15%
“Rural” atmosphere	451	451/568	79.40%
Lower taxes	259	259/568	45.60%
Lower cost of living	99	99/568	17.43%
Distance from metro area	294	294/568	51.76%
5. What features apply to subdivision			
Subdivision roads gravel	292	292/568	51.41%
Road private	274	274/568	48.24%
Don’t know	45	45/568	7.92%
Access roads gravel	173	173/568	30.46%
Open ditches	453	453/568	79.75%
Central storm water	15	15/568	2.64%
Wells	185	185/568	32.57%
Rural water	419	419/568	73.77%
City water	11	11/568	1.94%
On-site septic	380	380/568	66.90%
Central sanitary	138	138/568	24.30%
6. Urban services that are missed			
Paved roads	171	171/568	30.11%
Publicly owned roads	51	51/568	8.98%
Central sanitary	138	138/568	24.30%
Central storm water	15	15/568	2.64%
Proximity to metro area	37	37/568	6.51%
Sidewalks, trails	112	112/568	19.72%
Open space and parks	15	15/568	2.64%
Street trees	23	23/568	4.05%
Street lights	40	40/568	7.04%
Proximity to 911 responders	77	77/568	13.56%

7. Dislikes of your subdivision			
Quality of subdivision roads	136	135/568	23.77%
Quality of access roads	81	81/568	14.26%
On site septic systems	60	60/568	10.56%
Ditches	67	67/568	11.80%
Truck traffic from farms	16	16/568	2.82%
Dust/chemicals from farms	50	50/568	8.80
Noise from farms	2	2/568	0.35%
Odors from farms	13	13/568	2.29%
8. Has access been blocked by floods			
No	193	193/553	34.90%
Yes	360	360/553	65.10%
If yes, did is it a cause for concern			
Yes	70	70/186	37.63%
No	116	116/186	62.37%
9. Would you prefer paved roads			
Yes	222	222/312	71.15%
No	90	90/312	28.85%
Even if increased personal cost			
No	40	40/214	18.69%
Yes	174	174/214	81.31%
Roads paved by developer	56	56/158	35.44%
Roads paved by residents	102	102/158	64.56%
$0-2000	65	65/156	41.67%
$2000-4000	57	57/156	36.54%
$4000-6000	25	25/156	16.03%
$6000+	9	9/156	5.77%
10. Rate subdivision roads			
Good	363	363/562	64.59%
Neutral	148	148/562	26.33%
Bad	51	51/562	9.07%
11. Rate subdivision ditches			
Good	303	303/542	55.90%
Neutral	186	186/542	34.32%
Bad	53	53/542	9.78%
10. Rate subdivision			
Good	506	506/562	90.03%
Neutral	53	53/562	9.43%
Bad	3	3/562	0.53%