

BEFORE THE POWER SITING BOARD OF THE STATE OF OHIO

In the Matter of the Application of Hardin Wind Energy LLC for a Second Amendment to its Certificate to Install and Operate a Wind-Powered Electric Generation Facility in Hardin County, Ohio.) **Case Number**
) **14-1030-EL-BGA**
)

Members of the Board:

Chairman, Public Utilities Commission	Ohio House of Representatives
Director, Development Services Agency	Ohio Senate
Director, Department of Health	
Director, Department of Agriculture	
Director, Environmental Protection Agency	
Director, Department of Natural Resources	
Public Member	

To the Honorable Power Siting Board:

Please review the attached Staff Report of Investigation, which has been filed in accordance with the Board's rules. The amended application in this case is subject to an approval process as required by Section 4906.03 of the Ohio Revised Code.

Please present any concerns you or your designee may have with this case to my office at your earliest convenience.

Sincerely,

RAS

Patrick Donlon
Interim Executive Director
Ohio Power Siting Board
(614) 466-6692
ContactOPSB@puc.state.oh.us

OPSB STAFF REPORT OF INVESTIGATION

Case Number: 14-1030-EL-BGA
Project Name: Hardin Wind Farm, Second Amendment
Project Location: Hardin County
Applicant: Hardin Wind Energy, LLC
Application Filing Date: June 5, 2014
Filing Type: Amendment
Inspection Date: July 11, 2014
Report Date: October 9, 2014
Applicant's Waiver Requests: none
Staff Assigned: D. Rostofer, M. Bellamy

Amendment Description

Hardin Wind Energy, LLC seeks to amend the Certificate issued for the Hardin Wind Farm in case number 11-3446-EL-BGA. The original Certificate for the Hardin Wind project, issued in case number 09-0479-EL-BGN, authorized the construction of up to 200 turbine sites for a combined generation capacity of 300 megawatts (MW), in three phases of development. The first amendment to the project, in case number 11-3446-EL-BGA, dealt only with Phase 1a, which includes 132 turbine sites.

In this case, the second amendment, the Applicant intends to construct the project in a single phase with up to 121 turbine sites. Additionally, the Applicant is proposing new technologies (turbine models). These turbine models would have a similar hub height and rotor diameters to the General Electric (GE) 1.6-100, which was approved in case 11-3446-EL-BGA. The turbine models proposed in this case include the GE 1.85-87, GE 1.7-100, GE 1.7-103, GE 2.2-107, and GE 2.5-120. The rotor diameters of these models range between 87 meters and 120 meters, with a hub heights ranging between 80 meters and 85 meters. The tip heights would range between 123.5 meters and 145 meters, with total turbine heights ranging between 405 feet and 476 feet.

The proposed amendment project is within the original certificated project area. However, the layout of the turbine sites, collection lines, access roads, and associated facilities has changed to accommodate the new turbine models and other considerations. The maps included in this report depict the new layout in comparison to the original application.

The amended electric collection system would consist of 68 miles of underground cable buried to a minimum depth of 36 inches. The project substation is located on the same property as in the original application. However, the exact location has been altered slightly to avoid impacts to cultural resources. Approximately 40 miles of new or improved access roads are needed to support the facility. The access roads would be up to 75 feet wide during construction. After construction, most access roads would be reduced to an average of 20 feet wide including up to 15 feet of gravel roadway plus two feet of gravel shoulders on each side of the completed road.

Amendment Review

Land Use and Cultural Resource Impacts

The amended project would have a slightly larger footprint than the same portion of the original certificated project layout. Permanent land use impacts would increase from approximately 87 acres to

116 acres, an increase of approximately 0.5 percent from the original project. Approximately 98 percent of the land that would be permanently impacted is currently in active agricultural use. All landowners with direct land use impacts would be compensated through lease payments.

The Applicant performed various archaeological and architectural studies for this project between 2009 and 2011. Based on survey results, the Applicant developed an Archeological Site Avoidance Plan (ASAP), dated August 2011, to avoid sites eligible for listing in the National Register of Historic Places (NRHP) that were found in the project area. This plan was accepted by the Ohio Historic Preservation Office (OHPO) in a letter dated December 2011. Disturbance of those areas listed in the ASAP would be avoided with this amendment.

The Applicant entered into a Memorandum of Understanding (MOU) with the OHPO concurrence by the Hardin County Historical Museums, Inc., in May 2011. This MOU stipulated certain mitigation measures for effects of the wind farm on local cultural resources. The assessment of aesthetic impacts has not changed from the application in case number 09-0479-EL-BGN.

Economics

This amendment would not significantly change the public economic benefits of the project. The increased efficiency of the proposed turbine models would improve the economic viability of the project.

Setbacks

The setback distances to the closest non-participating residential structure and the closest non-participating property line for each proposed turbine model are found in Attachment A of the staff report.

Ecological Impacts

New water resources would be crossed by the amended project layout. The new resources include nine ditch crossings by collection lines and one for a permanent access road. Collection lines would be horizontally directional drilled to avoid direct impacts to streams and ditches. Access roads have been located so as to avoid direct impacts to streams, wetlands, and ditches.

The Applicant conducted a presence/absence survey for concentrations of freshwater mussel populations during June 2011. Only seven live individuals of two common and native freshwater mussel species were identified. No additional state or federally listed endangered, threatened, candidate, or proposed species were identified. Prior to construction, the Applicant would conduct additional mussel surveys at locations where project facilities cross underneath streams and ditches. The Applicant has committed to avoid impacts to freshwater mussels by relocating infrastructure associated with this project. The project area is largely comprised of agricultural land and therefore provides limited unique and/or high-quality wildlife habitat. However, segments of the project do contain habitats likely to support common reptilian, amphibian, avian, mammalian, and aquatic species. These species would likely be impacted, both directly and indirectly, during the construction, operation, and maintenance of the proposed facility. Faunal impacts would include the loss of habitat; increased habitat fragmentation; increased disturbance such as noise, lighting, human activity, and temporary and permanent displacement. In addition, operational impacts are expected to include bird and bat mortalities from direct strikes. Mortality to bats may also occur from barotraumas.¹

Public Health and Safety

Staff reviewed the amended application and information from the turbine manufacturer regarding the nature of probable impacts from high winds, blade shear, and ice throw. Staff believes that the recommended conditions of the Certificate issued in case number 09-0479-EL-BGN adequately addresses these issues. Construction and operational noise impacts of the project would not significantly change

¹ Barotraumas are any of several injuries arising from changes in pressure upon the body.

with the amendment. No receptors are expected to receive noise levels in excess of the previously conditioned ambient daytime LEQ plus five dBA allowance.

The Applicant has stated that any turbine forecasted prior to construction to create in excess of 30 hours per year of shadow flicker at a non-participating receptor within 1,000 meters would be subject to shadow flicker minimization measures and possible mitigation. Mitigation would be completed before commercial operation commences and consist of either reducing the turbine's forecasted impact to 30 hours per year, or other measures confirmed by Staff to be in compliance with this commitment. This representation is based on model results, and actual shadow flicker levels may differ when the wind farm is in operation. Therefore, Staff recommends that the certificate be conditioned upon the requirement that the Applicant operate the facility so that no more than 30 hours of shadow flicker per year is actually experienced at any non-participating receptor.

The Applicant states that all turbine locations at the new hub height have been submitted for Federal Aviation Administration (FAA) review in June 2014. The Applicant anticipates there will be no potential issues with any of the turbines sites. Staff would recommend that the Applicant is required to provide determinations of *no hazard* to aviation for all turbine sites to Staff for review prior to the initial preconstruction meeting. For sites that are determined to be *a hazard* to aviation, Staff would recommend that those sites should not be utilized to construct turbines.

Communications

The Applicant has evaluated the potential impacts of the amended turbines on microwave paths and radio, television, and cellular reception. The Comsearch "Microwave Report" dated June 9, 2011, reviewed licensed microwave paths that intersect the project area, including two operated by W.A.T.C.H. TV Company (WATCH) and two operated by Mid-Ohio Energy Cooperative, Inc. (Mid-Ohio). In addition, eight unlicensed paths were reviewed for potential interference. The 2.5 gigahertz (Ghz) point to multi-point operation operated by WATCH was not included within the June 2011 Comsearch Report. Therefore, Staff cannot assess the impacts the turbines may cause to this system. A review of potential turbine impacts upon this and any other known system should be circulated to WATCH for review and submitted to Staff for review prior to construction of the project. The Applicant should be required to avoid impacts to these systems unless acceptable mitigation is proposed to the affected path owner/operator/licensee(s), and reviewed by Staff.

The June 2011 Comsearch Report provides that the 11 and 18 Ghz microwave paths operated by Mid-Ohio have been reviewed and would not be adversely impacted. However, Staff is uncertain that the Mid-Ohio unlicensed 900 megahertz (Mhz) omni-directional system used to control down line electrical distribution equipment was adequately considered within the report. Further, issues have been raised about the accuracy of the coordinates utilized in determining the microwave beam paths for Mid-Ohio systems. Therefore, the Applicant should retain a third-party licensed surveyor to identify the exact location of these systems in order to determine the distance between turbines and worst-case Fresnel zones. The Applicant should be required to avoid impacts to these systems unless acceptable mitigation is proposed to the affected path owner/operator/licensee, and reviewed by Staff.

Decommissioning

The Applicant made no changes to the original and first amendment application in regard to decommissioning. As such, Staff believes that the conditions of the original Certificate are adequate.

Conclusion

The proposed amendment results in no additional socioeconomic or environmental impact compared to the original Certificate. Despite the modest increase in the facility's footprint, the Applicant has modified the layout to reduce impacts to sensitive receptors and resources in the project area.

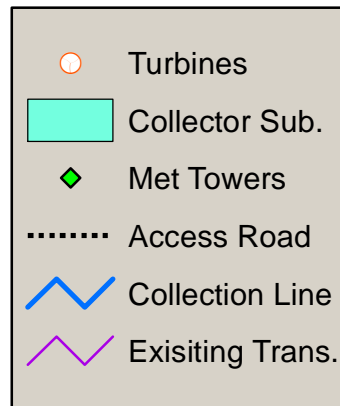
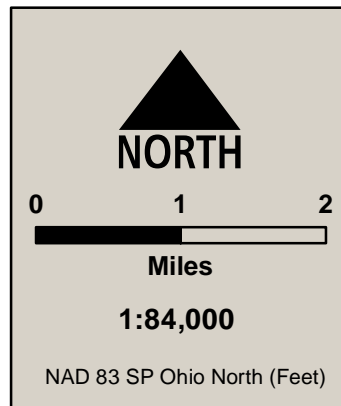
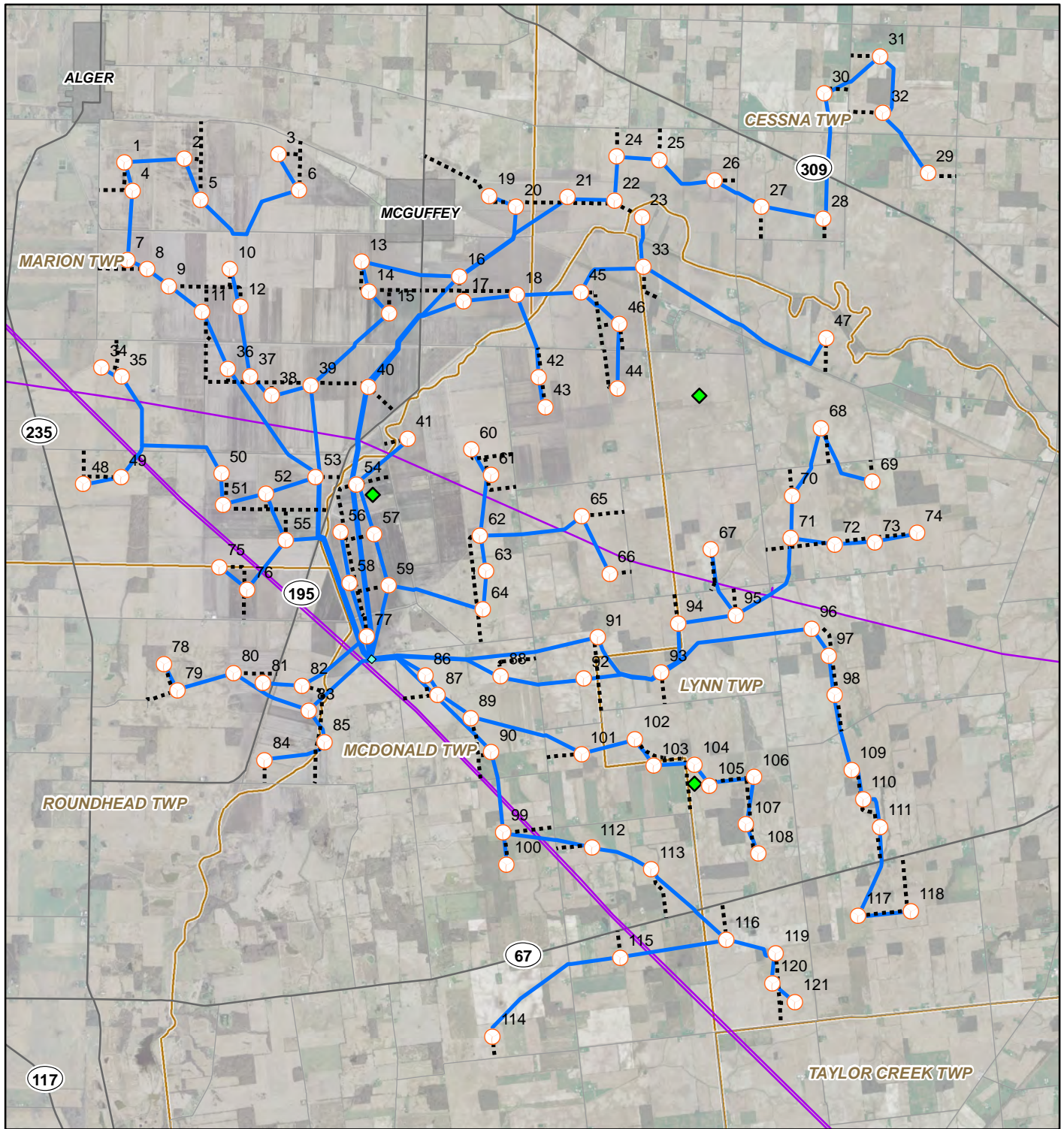
Recommended Findings

Staff recommends that the Board find that the proposed amendment to the Certificate poses minimal social and environmental impact, provided that the amended Certificate includes the conditions specified in this report.

Recommended Conditions

1. The Applicant shall adhere to all conditions of the original Certificate for the Hardin Wind Farm in case number 09-0479-EL-BGN.
2. The Applicant shall adhere to all conditions of the amended Certificate for the Hardin Wind Farm in case number 11-3446-EL-BGA.
3. The Applicant shall initiate consultation with the U.S. Fish and Wildlife Service (USFWS) under provisions of Section 7 or Section 10 of the Endangered Species Act prior to construction of the portion of the project located east of County Road 65 and south of County Road 130 in Lynn and McDonald townships, Hardin County. The Applicant shall obtain all necessary USFWS permits prior to beginning construction in the portion of the project as defined in the above sentence. A copy of all documentation produced during the USFWS formal consultation process and all necessary USFWS permits shall be submitted to Staff for review to ensure compliance with this condition.
4. The Applicant shall install the facility at the proposed site as presented in the amendment filed on June 5, 2014, and as modified or clarified by subsequent filings.
5. Prior to construction, the Applicant shall update the Phase I archaeological survey previously performed for the Hardin Wind Farm, to reflect changes in the project as described in this amendment. This updated Phase I archaeological survey for the amended portion of the project shall be submitted to Staff and all signatories of the May 2011 MOU regarding cultural impacts. If the additional survey work discloses a find of cultural or archaeological significance, or a site that could be eligible for inclusion in the NRHP, then the Applicant shall submit an avoidance or mitigation plan for Staff's review to ensure compliance with this condition. Any such mitigation effort shall be developed in coordination with the OHPO, with input from the Hardin County Historical Museums, Inc., and submitted to Staff for review to ensure compliance with this condition.
6. The Applicant shall provide all FAA 7460-1 and Ohio Department of Transportation Office of Aviation letters of determination to Staff for review, to ensure compliance with this condition, at least 30 days prior to construction. The Applicant shall provide the final locations of permanent meteorological towers to Staff at least 30 days prior to construction. If the height of the towers will exceed 200 feet above ground level, the tower locations must be submitted to the FAA for review to ensure compliance with this condition.
7. At least 30 days prior to construction, the Applicant shall provide to Staff, for review to ensure compliance with this condition, documentation from the FAA indicating that the Lima-Allen County Airport VHF Omnidirectional Radar approach has been cancelled.
8. At least 30 days prior to construction, the Applicant shall assess the potential impacts of the project to WATCH's 2.5 GHz point to multi-point system, Mid-Ohio's 900 MHz omnidirectional system, and any other microwave path or system that was known to operate within the project area at the time of the amendment application filed on June 5, 2014. A copy of this study shall be provided to WATCH and Mid-Ohio for review and to Staff for review to ensure compliance with this condition. The assessment shall conform to the following requirements:

- a. An independent and registered surveyor, licensed to survey within the state of Ohio, shall determine the dimensions of WATCH's 2.5 GHz point to multi-point system, Mid-Ohio's 900 MHz omnidirectional system, and any other known microwave path or system operating within the project area at the time of the amendment filed on June 5, 2014, and the center point of all turbines within 1,000 feet of the worst-case Fresnel zone of each system, using the same survey equipment.
 - b. Provide the distance (feet) between the surveyed center points of each turbine identified within section (a) above and the surveyed worst-case Fresnel zone of each microwave system path.
 - c. Provide the distance (feet) between the nearest rotor blade tips of each surveyed turbine identified within section (a) above and the surveyed worst-case Fresnel zone of each microwave system path.
 - d. Provide a map of the surveyed microwave paths and turbines at a legible scale.
 - e. Describe the specific, expected impacts of the project on all microwave paths and systems considered in the assessment.
9. The Applicant shall avoid or mitigate any expected interference or impacts to microwave paths and systems as identified in the assessment required by Condition 8 of this report and all other communications studies performed for this project. The Applicant shall complete avoidance or mitigation measures prior to construction for impacts that can be predicted in sufficient detail to implement appropriate and reasonable avoidance and mitigation measures. After construction, the Applicant shall mitigate all observed impacts of the project to microwave paths and systems within seven days or within a longer time period approved by the OPSB. All avoidance and mitigation measures shall consist of either shifting the location of the turbine(s) so as to not affect any known microwave paths and systems, or other measures acceptable, the Applicant, and the affected path owner, operator, or licensee, and reviewed by Staff to ensure compliance with this condition.

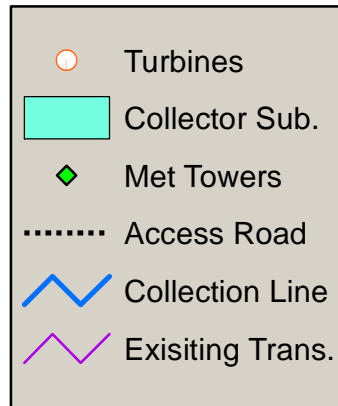
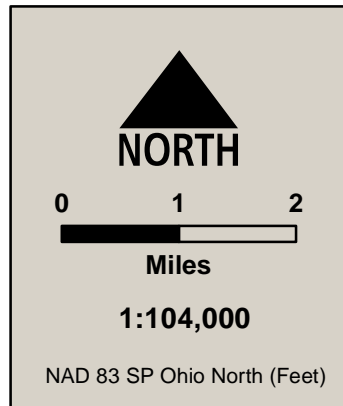
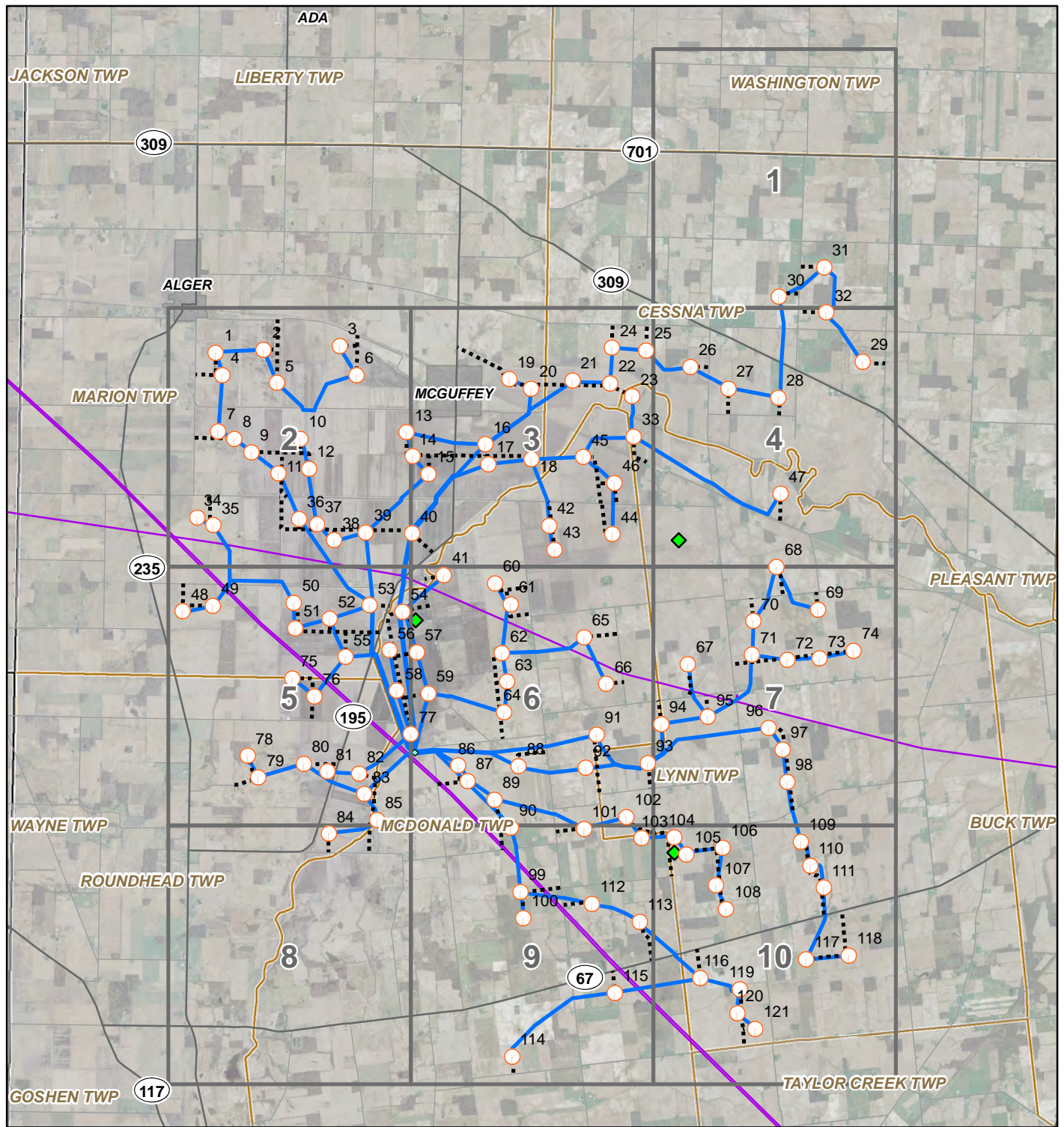


Overview Map

14-1030-EL-BGA

Hardin Wind Second Amendment

Maps are presented solely for the purpose of providing a visual representation of the project in the staff report, and are not intended to modify the project as presented by the Applicant in its certified application and supplemental materials.



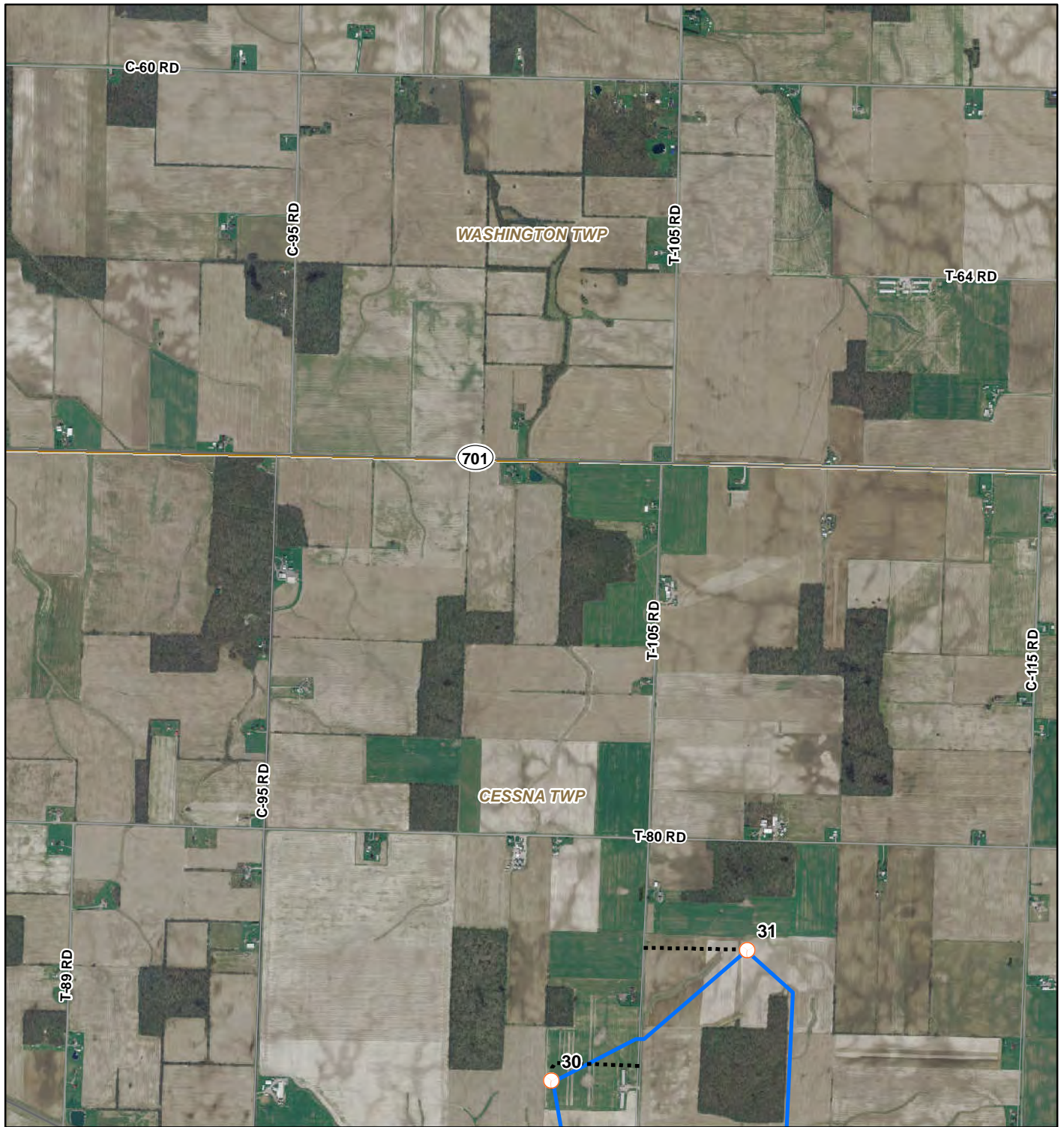
Map Index

14-1030-EL-BGA

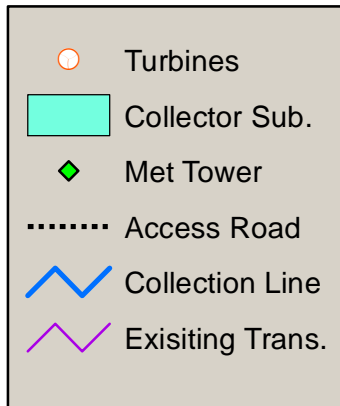
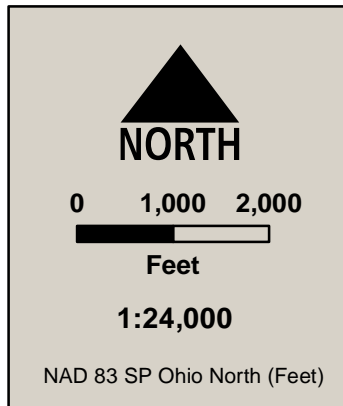
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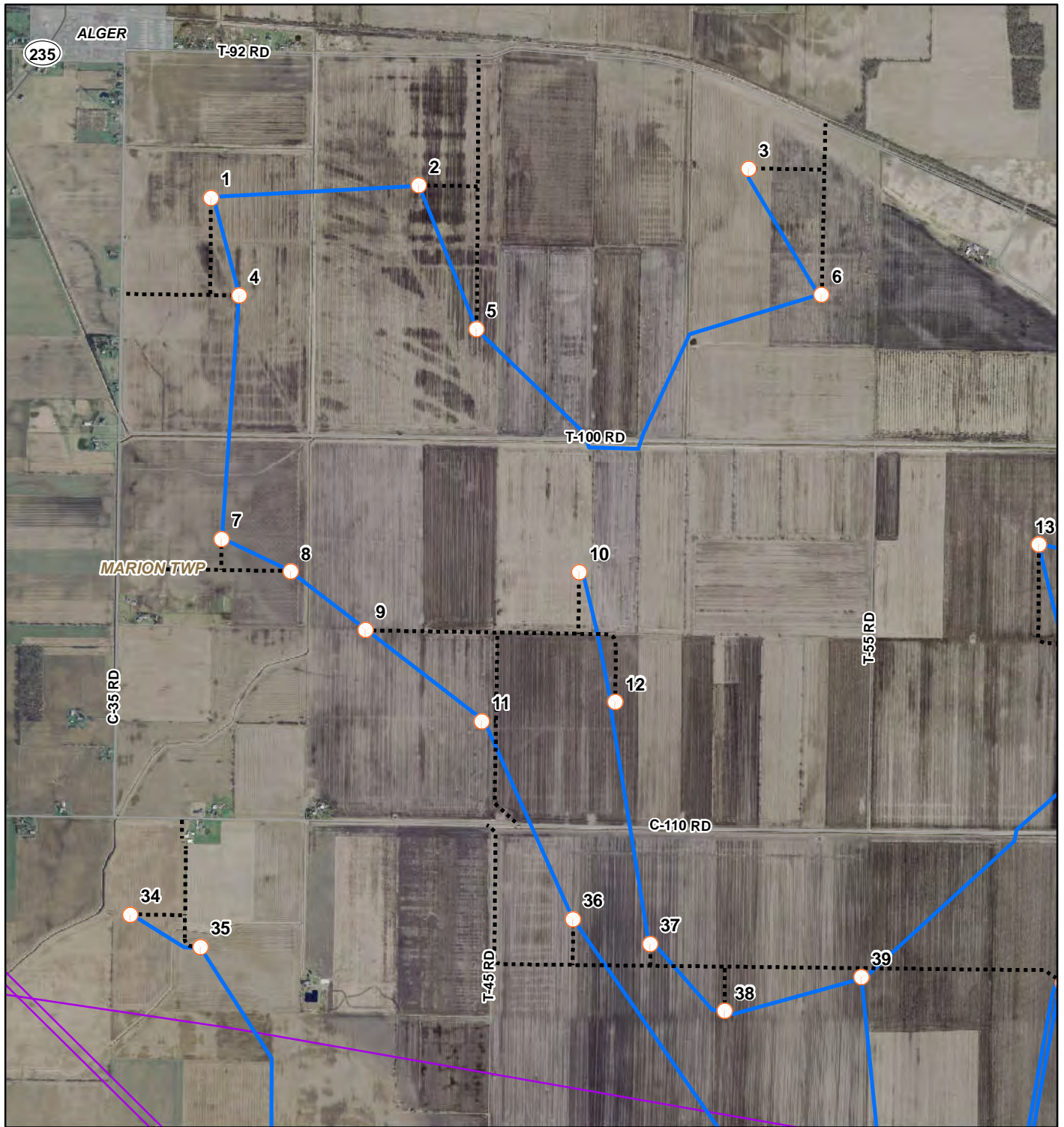
Map Page 1

14-1030-EL-BGA

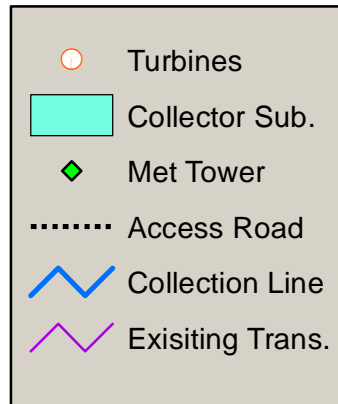
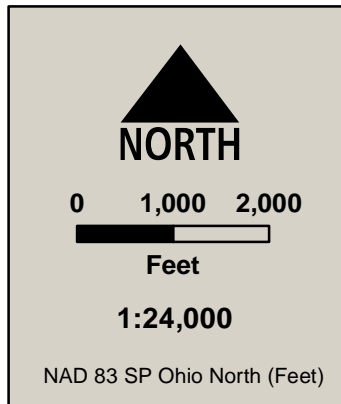
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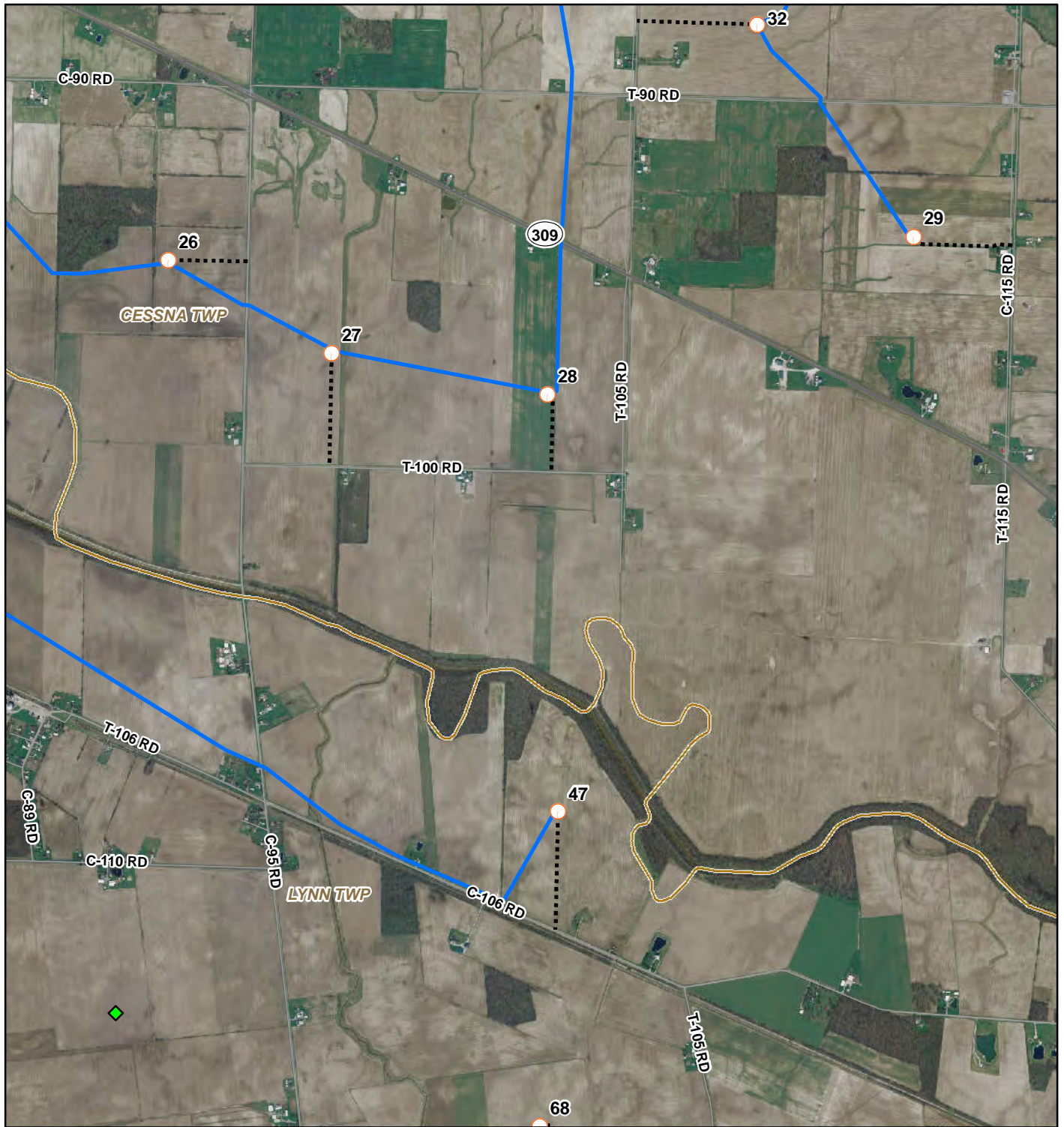
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14-1030-EL-BGA

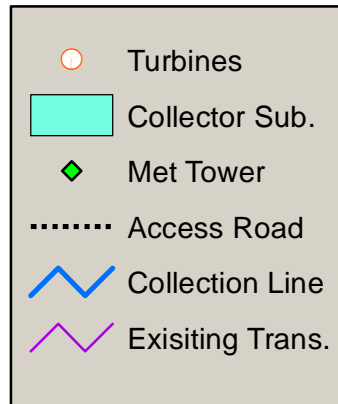
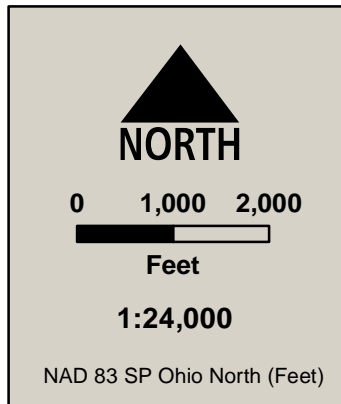
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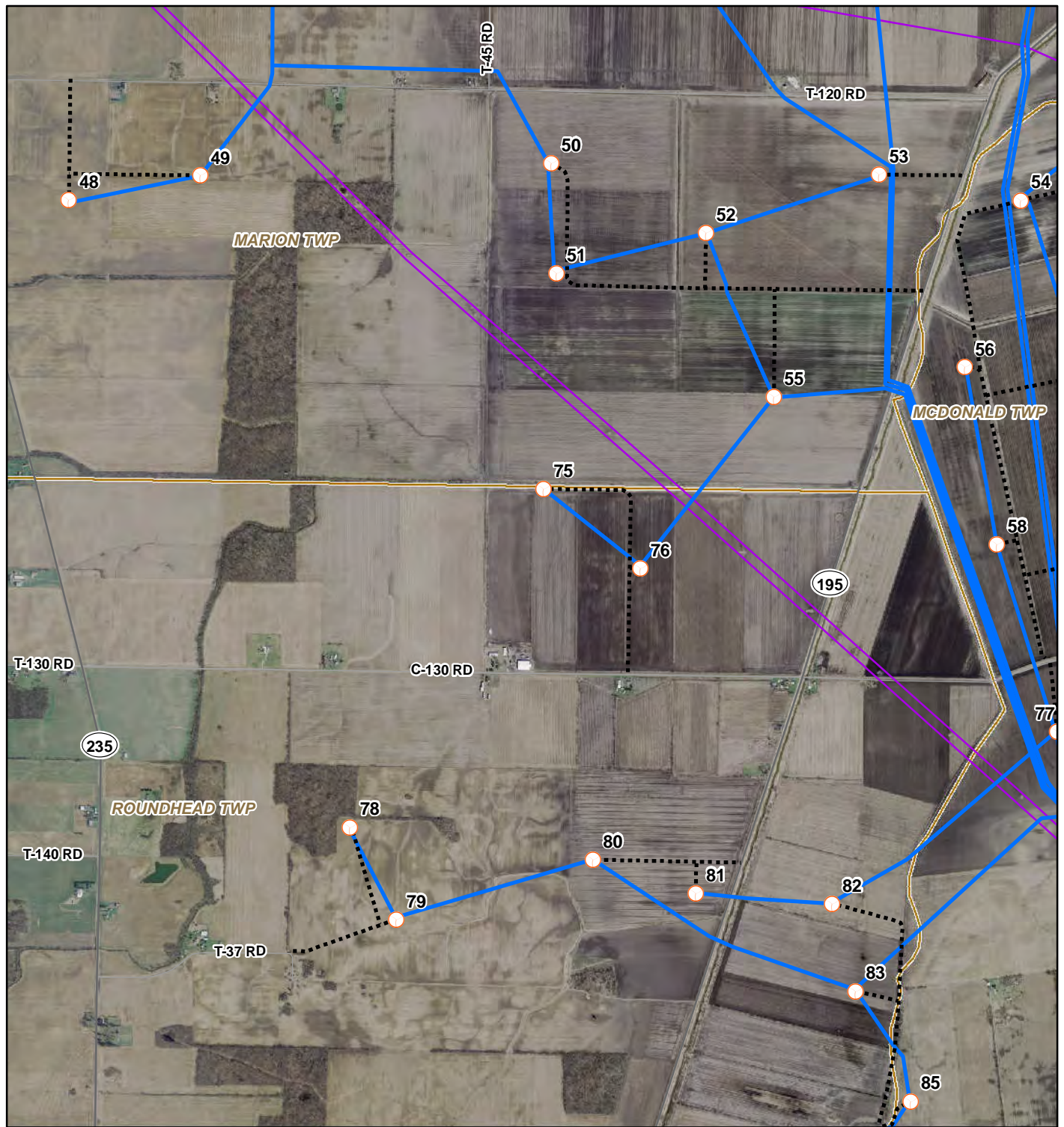
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14-1030-EL-BGA

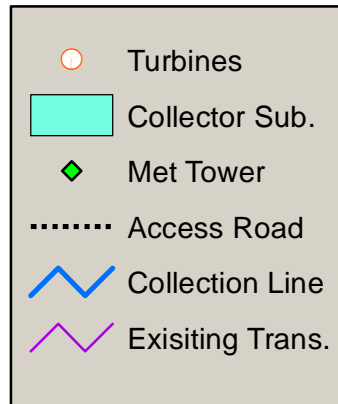
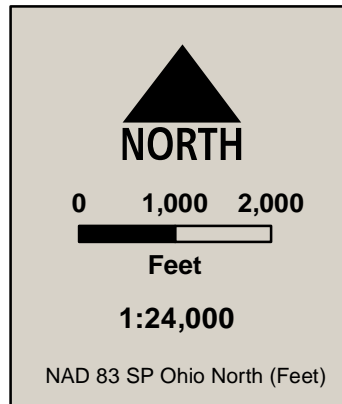
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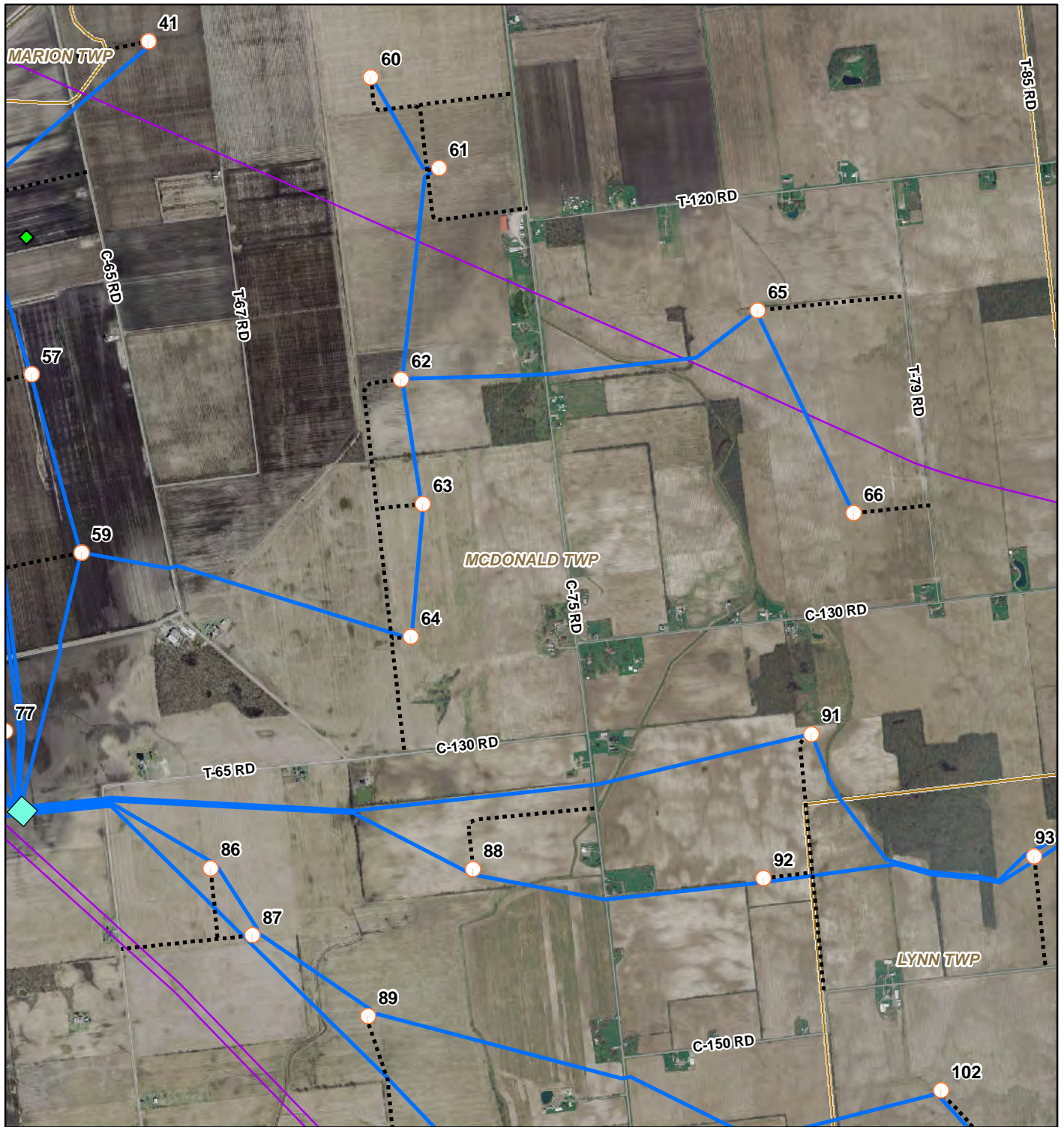


Map Page 5

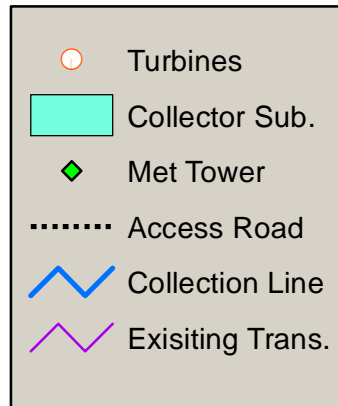
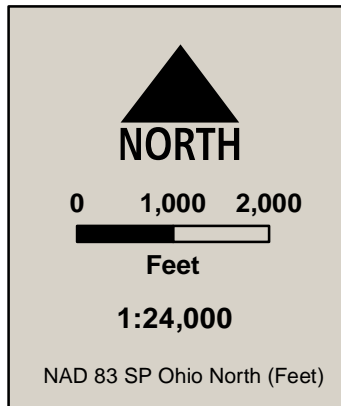
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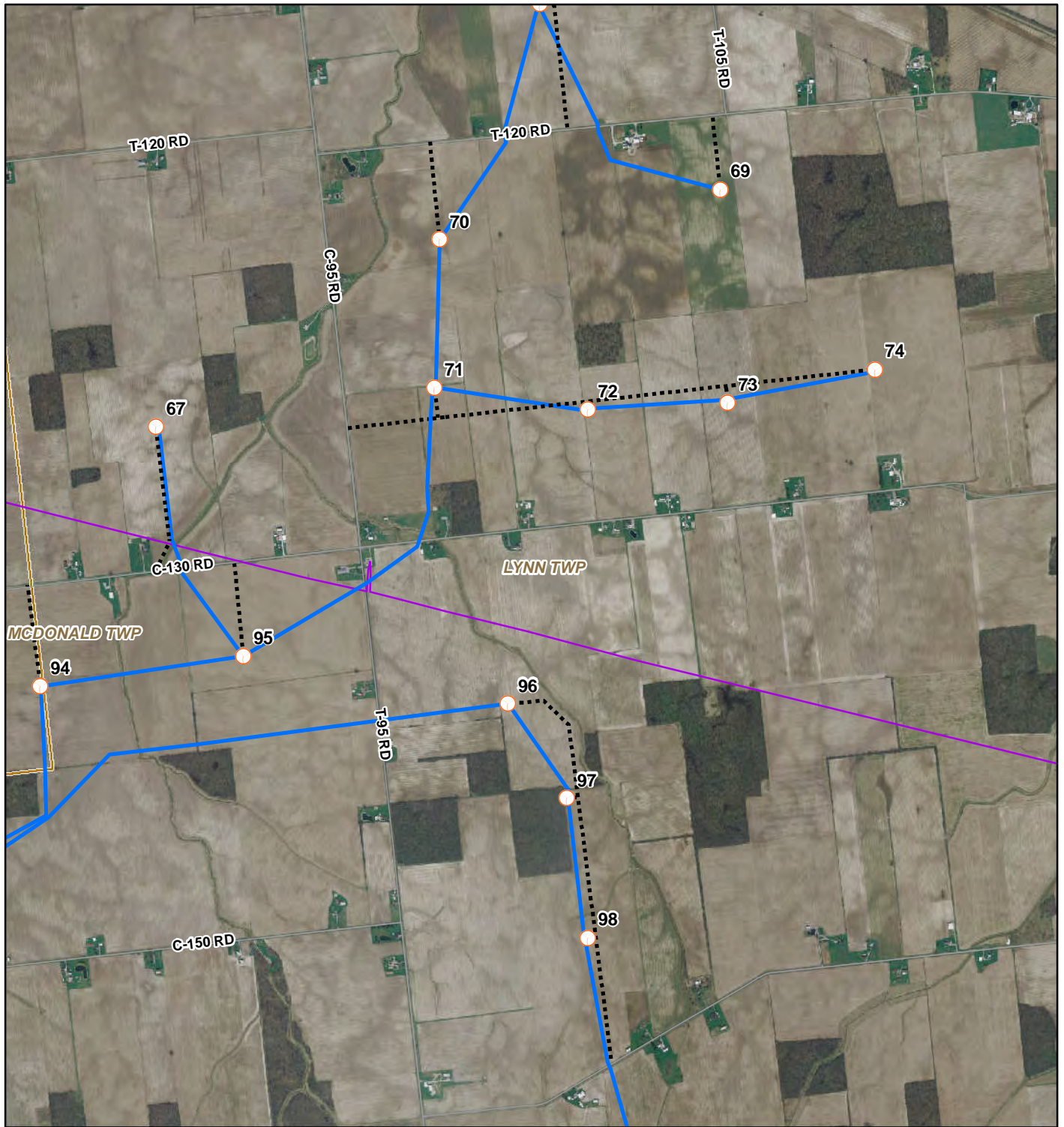
Map Page 6

14-1030-EL-BGA

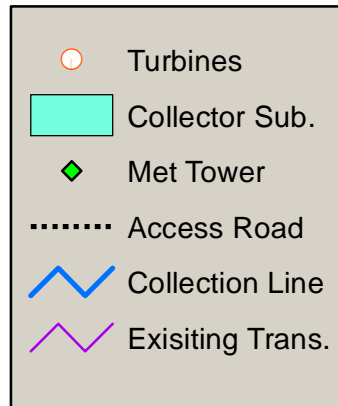
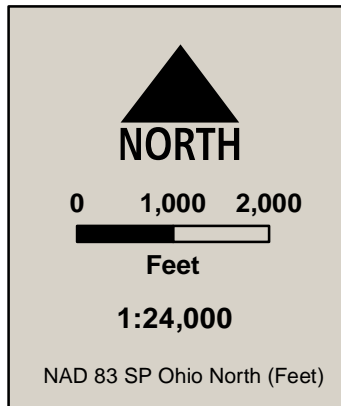
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Map Page 7

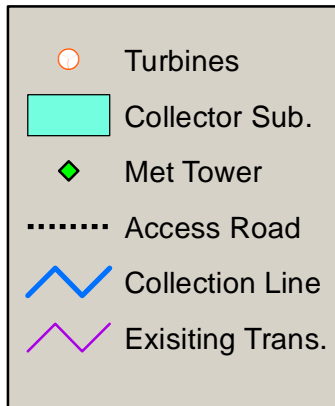
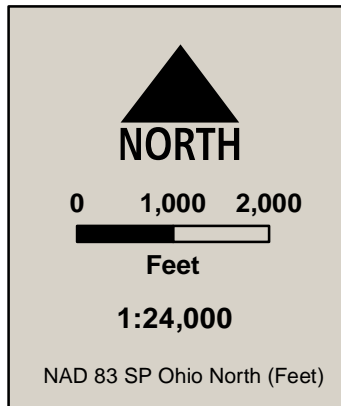
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Map Page 8

14-1030-EL-BGA

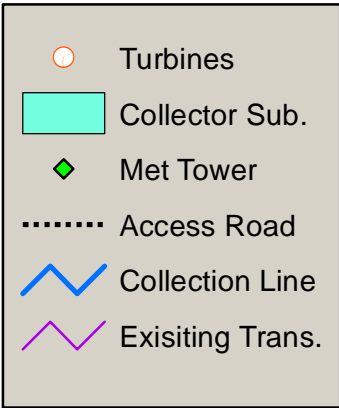
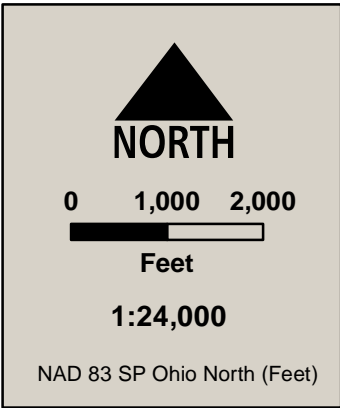
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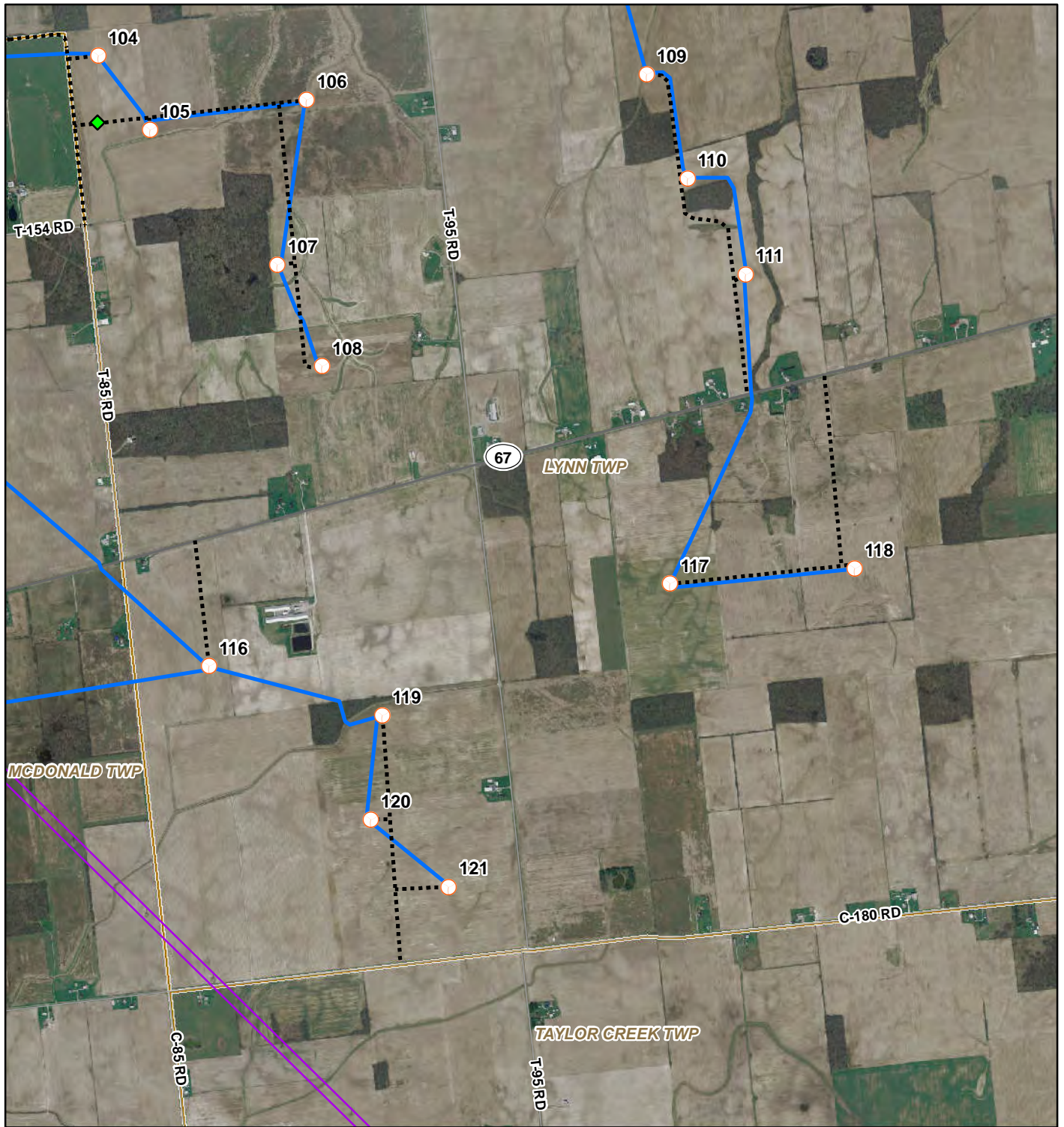
Map Page 9

14-1030-EL-BGA

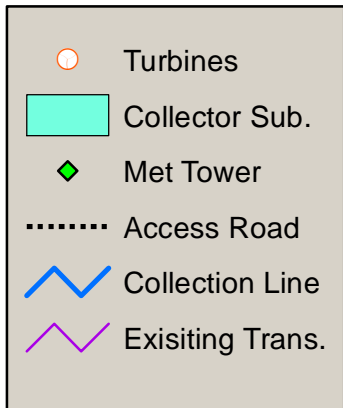
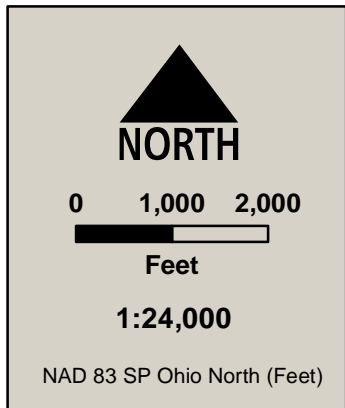
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Map Page 10
14-1030-EL-BGA
Hardin Wind
Second Amendment

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Attachment A: Non-Participating Setback Distances

Closest Non-Participating Residential Structure Setback Distance (ft.)

Turbine Model	1.85-87	1.7-100	1.7-103	2.2-107	2.5-120
Minimum Setback Distance Per Turbine Model	<445.6	<469	<474.5	<481.7	<523.2

Closest Non-Participating Property Line Setback Distance (ft.)

1.85-87	1.7-100	1.7-103	2.2-107	2.5-120
<1267.7	<1289	<1293.9	<1300.5	<1321.8

Turbine Site					
1	1403	1382	1377	1370	1349
2	2480	2459	2454	2447	2426
3	3763	3741	3736	3730	3709
4	1568	1547	1542	1535	1514
5	4557	4536	4531	4524	4503
6	3386	3365	3360	3353	3332
7	1418	1397	1392	1385	1364
8	2078	2057	2052	2045	2024
9	2491	2470	2465	2458	2437
10	4829	4807	4802	4796	4774
11	2510	2488	2483	2477	2456
12	4313	4292	4287	4281	4259
13	1495	1474	1469	1462	1441
14	2729	2707	2702	2696	2675
15	2567	2546	2541	2534	2513
16	1615	1594	1589	1582	1561
17	2022	2000	1995	1989	1968
18	2632	2611	2606	2600	2578
19	1900	1878	1873	1867	1845
20	2296	2274	2269	2263	2242
21	3223	3202	3197	3190	3169
22	3465	3443	3438	3432	3411
23	4376	4355	4350	4343	4322
24	1716	1694	1689	1683	1662
25	2432	2411	2406	2400	2378
26	2177	2156	2151	2144	2123
27	1517	1496	1491	1484	1463
28	1407	1386	1381	1375	1353
29	1364	1343	1338	1331	1310
30	1604	1582	1577	1571	1549
31	1456	1434	1429	1423	1402
32	1706	1685	1680	1673	1652
33	2471	2449	2445	2438	2417
34	1456	1435	1430	1423	1402
35	1411	1390	1385	1378	1357
36	3615	3594	3589	3582	3561
37	4270	4249	4244	4237	4216
38	4309	4287	4283	4276	4255
39	6161	6140	6135	6128	6107
40	5081	5059	5054	5048	5026
41	1941	1920	1915	1908	1887
42	1468	1447	1442	1436	1414
43	1935	1914	1909	1902	1881
44	1425	1404	1399	1392	1371
45	2540	2518	2514	2507	2486
46	1755	1734	1729	1722	1701
47	1379	1357	1352	1346	1324
48	1388	1366	1362	1355	1334
49	1427	1406	1401	1394	1373
50	1450	1429	1424	1417	1396
51	2768	2747	2742	2735	2714
52	3752	3731	3726	3719	3698
53	5245	5223	5219	5212	5191
54	3288	3267	3262	3255	3234
55	3738	3717	3712	3705	3684
56	4596	4575	4570	4563	4542

1077	1055	1050	1044	1023
993	971	966	960	939
664	643	638	631	610
1490	1468	1464	1457	1436
1081	1060	1055	1049	1027
585	563	558	552	531
630	609	604	597	576
639	608	603	596	575
615	594	589	583	561
659	638	633	627	605
1127	1106	1101	1094	1073
873	852	847	840	819
1182	1161	1156	1150	1128
1567	1546	1541	1534	1513
1407	1386	1381	1374	1353
549	528	523	516	495
633	611	606	600	579
1153	1132	1127	1120	1099
578	557	552	546	524
1085	1064	1059	1052	1031
640	619	614	607	586
980	959	954	947	926
943	922	917	910	889
596	575	570	563	542
1991	1970	1965	1959	1937
899	878	873	867	845
934	912	907	901	879
938	917	912	905	884
636	614	609	603	581
625	604	599	592	571
1083	1062	1057	1051	1029
852	830	825	819	797
957	936	931	925	903
1197	1176	1171	1164	1143
1277	1255	1250	1244	1223
984	963	958	951	930
1882	1861	1856	1850	1828
2457	2435	2430	2424	2402
2131	2110	2105	2098	2077
2235	2214	2209	2203	2181
641	620	615	609	587
795	773	768	762	740
660	638	633	627	606
614	593	588	581	560
1003	982	977	970	949
1678	1657	1652	1645	1624
622	601	596	590	568
607	586	581	575	553
755	734	729	722	701
732	711	706	700	678
816	795	790	784	762
2894	2873	2868	2861	2840
2953	2932	2927	2920	2899
2486	2464	2459	2453	2431
1460	1439	1434	1427	1406
919	898	893	886	865

Turbine Site					
57	3607	3586	3581	3575	3553
58	2967	2946	2941	2934	2913
59	4191	4170	4165	4159	4137
60	1948	1926	1922	1915	1894
61	1489	1467	1462	1456	1435
62	1660	1639	1634	1627	1606
63	2087	2066	2061	2054	2033
64	1987	1966	1961	1954	1933
65	1455	1424	1429	1423	1401
66	1393	1371	1366	1360	1339
67	1547	1526	1521	1514	1493
68	1791	1770	1765	1758	1737
69	1618	1597	1592	1586	1564
70	1406	1385	1380	1373	1352
71	1670	1649	1644	1637	1616
72	1498	1476	1471	1465	1443
73	1431	1410	1405	1398	1377
74	1428	1407	1402	1395	1374
75	2424	2402	2398	2391	2370
76	1454	1433	1428	1421	1400
77	3046	3024	3019	3013	2992
78	2146	2125	2120	2113	2092
79	2340	2319	2314	2307	2286
80	2370	2349	2344	2337	2316
81	1818	1797	1792	1786	1764
82	1918	1897	1892	1885	1864
83	2988	2967	2962	2955	2934
84	2893	2871	2866	2860	2838
85	1456	1435	1430	1423	1402
86	1526	1504	1500	1493	1472
87	1827	1806	1801	1795	1773
88	1775	1753	1748	1742	1721
89	2879	2858	2853	2846	2825
90	1383	1362	1357	1350	1329
91	1594	1573	1568	1561	1540
92	1474	1452	1447	1441	1419
93	1890	1869	1864	1858	1836
94	1591	1570	1565	1558	1537
95	1423	1402	1397	1391	1369
96	1645	1624	1619	1613	1591
97	2402	2380	2375	2369	2348
98	1433	1412	1407	1401	1379
99	1849	1827	1822	1816	1794
100	2364	2343	2338	2331	2310
101	1426	1404	1399	1393	1372
102	1637	1616	1611	1605	1583
103	3203	3181	3177	3170	3149
104	2779	2758	2753	2747	2725
105	1896	1875	1870	1864	1842
106	1494	1472	1467	1461	1440
107	1903	1882	1877	1870	1849
108	1475	1454	1449	1442	1421
109	1615	1594	1589	1582	1561
110	2872	2850	2846	2839	2818
111	1384	1363	1358	1351	1330
112	2534	2512	2508	2501	2480
113	1959	1938	1933	1927	1905
114	2492	2471	2466	2459	2438
115	1381	1359	1354	1348	1326
116	1578	1557	1552	1546	1524
117	2049	2027	2023	2016	1995
118	2427	2406	2401	2394	2373
119	3061	3040	3035	3028	3007
120	3237	3215	3210	3204	3182

2434	2413	2408	2401	2380
519	498	493	487	465
2267	2246	2241	2234	2213
606	585	580	573	552
1285	1264	1259	1253	1231
510	488	483	477	455
870	849	844	837	816
1460	1439	1434	1427	1406
763	742	737	730	709
1031	1010	1005	999	977
605	583	578	572	550
586	565	560	554	532
868	847	842	835	814
1005	984	979	972	951
1124	1103	1098	1092	1070
1419	1398	1393	1386	1365
1160	1138	1134	1127	1106
1018	997	992	985	964
655	634	629	622	601
1330	1309	1304	1298	1276
1004	982	977	971	950
688	667	662	656	634
1354	1333	1328	1322	1300
1120	1099	1094	1087	1066
1566	1544	1540	1533	1512
1859	1838	1833	1827	1805
1700	1678	1673	1667	1646
540	519	514	508	486
1117	1096	1091	1084	1063
1254	1233	1228	1222	1200
1700	1678	1673	1667	1646
903	882	877	871	849
780	759	754	748	726
570	548	543	537	516
1502	1481	1476	1469	1448
799	778	773	767	745
948	927	922	915	894
672	650	645	639	618
1109	1087	1082	1076	1055
939	918	913	906	885
645	624	619	612	591
585	563	559	552	531
640	619	614	607	586
621	600	595	588	567
536	514	510	503	482
1099	1077	1073	1066	1045
1137	1116	1111	1104	1083
735	714	709	702	681
1352	1331	1326	1319	1298
959	937	932	926	904
1672	1651	1646	1639	1618
540	518	513	507	485
713	692	687	681	659
488	467	462	455	434
804	783	778	771	750
651	630	625	618	597
727	705	700	694	673
580	559	554	548	526
578	557	552	545	524
556	534	529	523	501
568	546	541	535	514
573	551	546	540	518
891	870	865	858	837
572	551	546	539	518

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