



Southwire®

C⁷® OVERHEAD CONDUCTOR BROCHURE



INNOVATION STARTS AT THE CORE

Lighter, Stronger, Tougher.

Southwire is revolutionizing the industry with its innovative C⁷® Overhead Conductor. With its unique stranded construction, Southwire's C⁷® Overhead Conductor is the most durable, rugged, and reliable composite core conductor on the market - and the only composite core conductor developed by a conductor manufacturer with full knowledge of utility needs and practices.



INTRODUCING C⁷[®] OVERHEAD CONDUCTOR

- **Minimal Thermal Expansion** – minimal sag increase at high power transfer
- **Stranded Core** – no single point of failure
- **Flexible** – robust, installs like traditional conductor
- **Less Sag** – for lines with clearance or structure limitations
- **Easy Installation** – uses traditional methods and familiar hardware
- **Designs For All Loading Conditions** – light loading to heavy ice loading
- **Trapezoidal Wire (TW) or Round Wire Available**
- **Aluminum-Zirconium (Al-Zr) or Annealed Aluminum (1350-O Temper)**

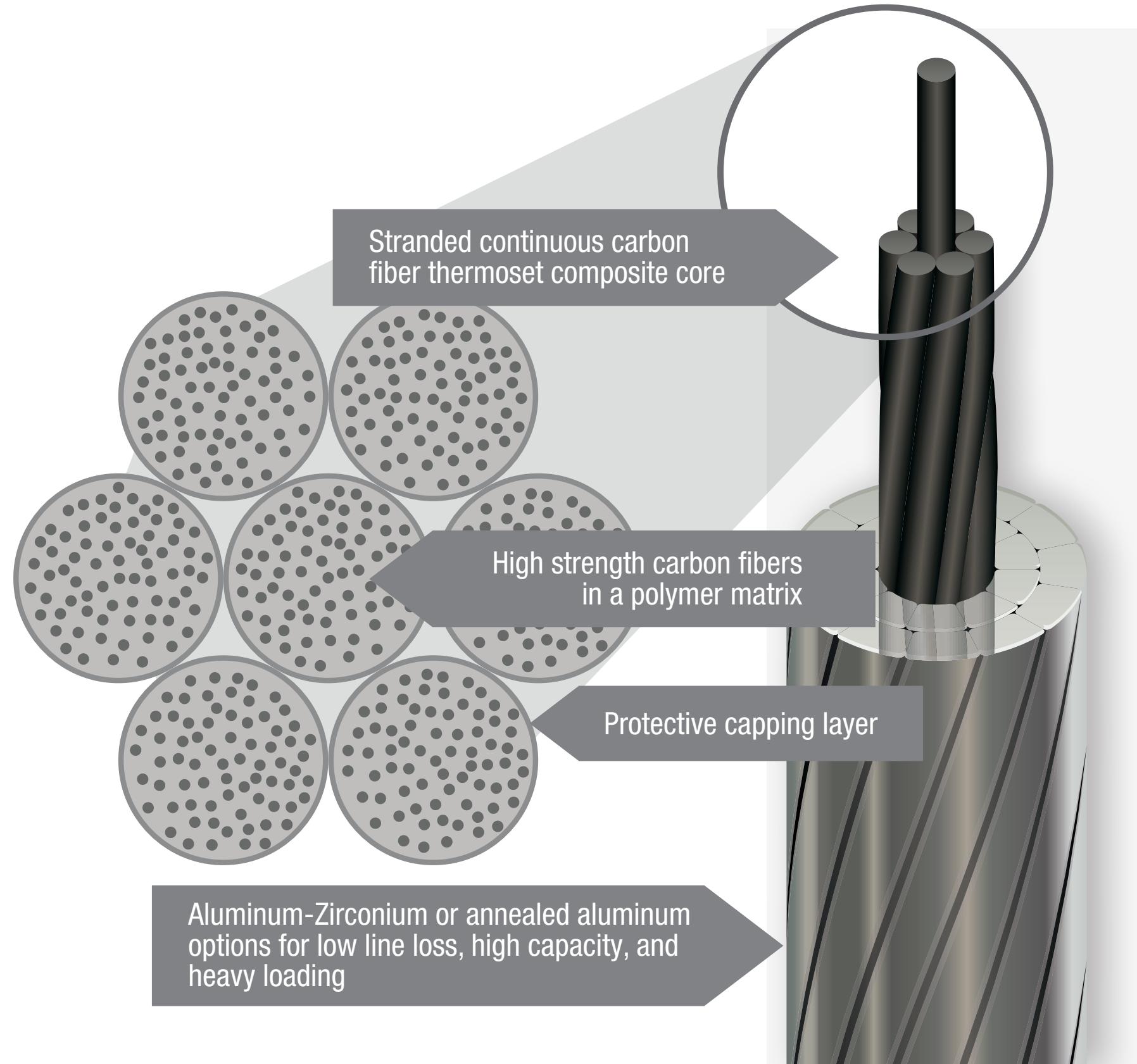
New Lines:

Reduce new line costs by saving on structures and foundations.

Cross challenging terrain or reduce the visual profile in sensitive areas. Build for the future with high capacity, low sag lines.

Reconductoring:

Double the capacity of existing ACSR lines. Light conductor weight and low sag allow use of existing structures and ROW, even for lines previously designed with all-aluminum or aluminum alloy (AAC, AAAC, ACAR) conductors.



PERFORMANCE ADVANTAGES

Proven Robust Materials

- Matrix materials have been used in demanding environments for over 50 years
- Resists harsh chemicals, high temperatures, and corrosion
- Resistant to abrasion and high-tension fatigue

Low Sag

- Minimal sag increase at high temperature
- For lines with clearance or structure limitations
- Reduce land requirements, structure size and height, and foundation costs
- Overcome objections to high-visual-profile lines
- Capacity for future system rating increases without sag increase consideration

Stranded Core

- Multi-strand, NO single-point of failure like single-rod designs
- More flexible than single-rod core designs
- Increased tolerance for bending

Suitable for Extreme Weather Loading

- Al-Zr option bolsters carbon fiber to carry heavy ice and wind loads with low sag

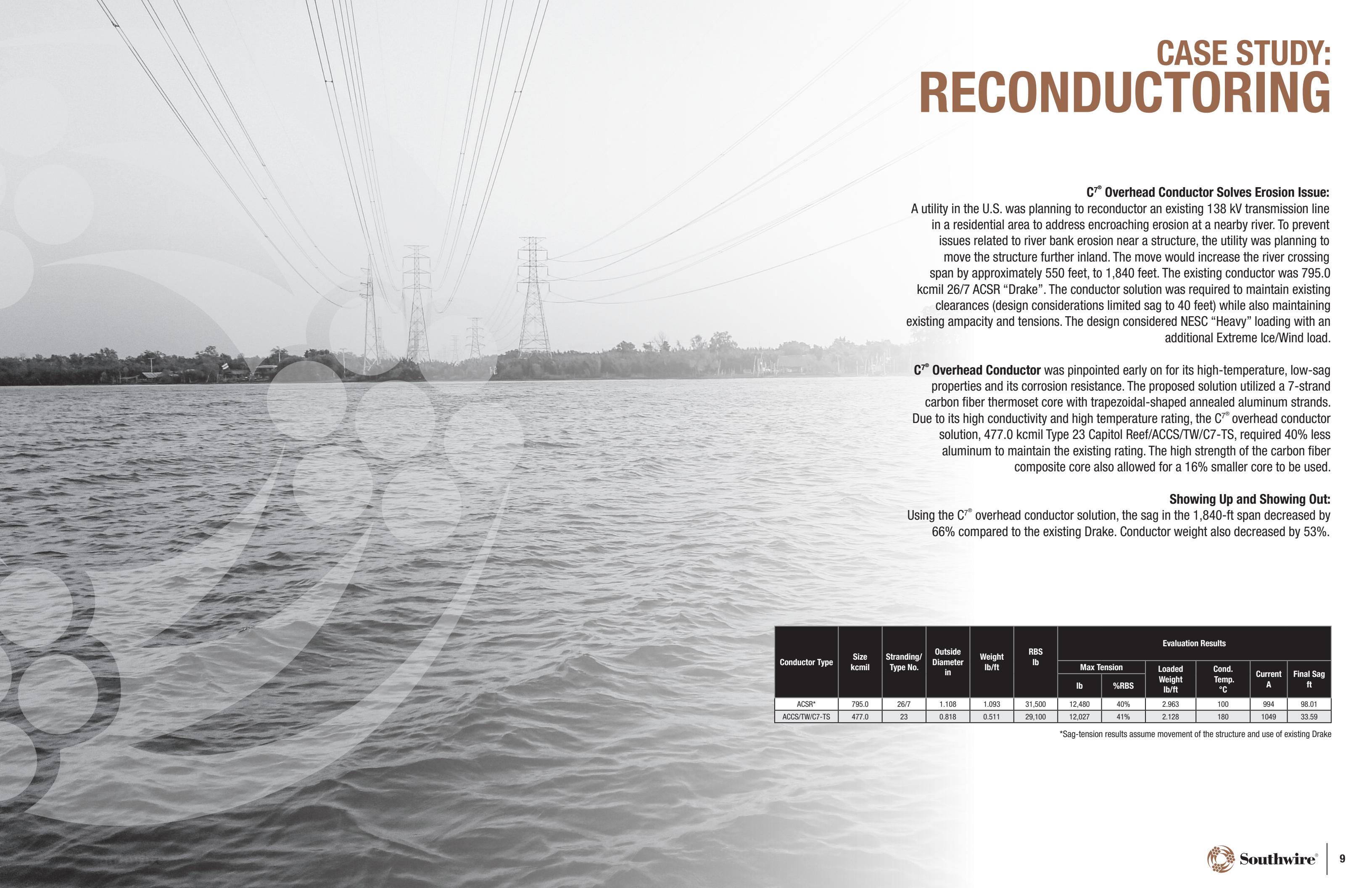
Increase Capacity

- Double the capacity of same-diameter ACSR round-wire conductor
- 180°C continuous, 200°C emergency ratings are material property based
- No losses due to core magnetization

Conventional Installation & Inspection

- Uses standard work practices and traditional hardware
- Same stringing blocks and installation equipment as ACSS





CASE STUDY: RECONDUCTORING

C⁷® Overhead Conductor Solves Erosion Issue:

A utility in the U.S. was planning to reconduct an existing 138 kV transmission line in a residential area to address encroaching erosion at a nearby river. To prevent issues related to river bank erosion near a structure, the utility was planning to move the structure further inland. The move would increase the river crossing span by approximately 550 feet, to 1,840 feet. The existing conductor was 795.0 kcmil 26/7 ACSR "Drake". The conductor solution was required to maintain existing clearances (design considerations limited sag to 40 feet) while also maintaining existing ampacity and tensions. The design considered NESC "Heavy" loading with an additional Extreme Ice/Wind load.

C⁷® Overhead Conductor was pinpointed early on for its high-temperature, low-sag properties and its corrosion resistance. The proposed solution utilized a 7-strand carbon fiber thermoset core with trapezoidal-shaped annealed aluminum strands. Due to its high conductivity and high temperature rating, the C⁷® overhead conductor solution, 477.0 kcmil Type 23 Capitol Reef/ACCS/TW/C7-TS, required 40% less aluminum to maintain the existing rating. The high strength of the carbon fiber composite core also allowed for a 16% smaller core to be used.

Showing Up and Showing Out:

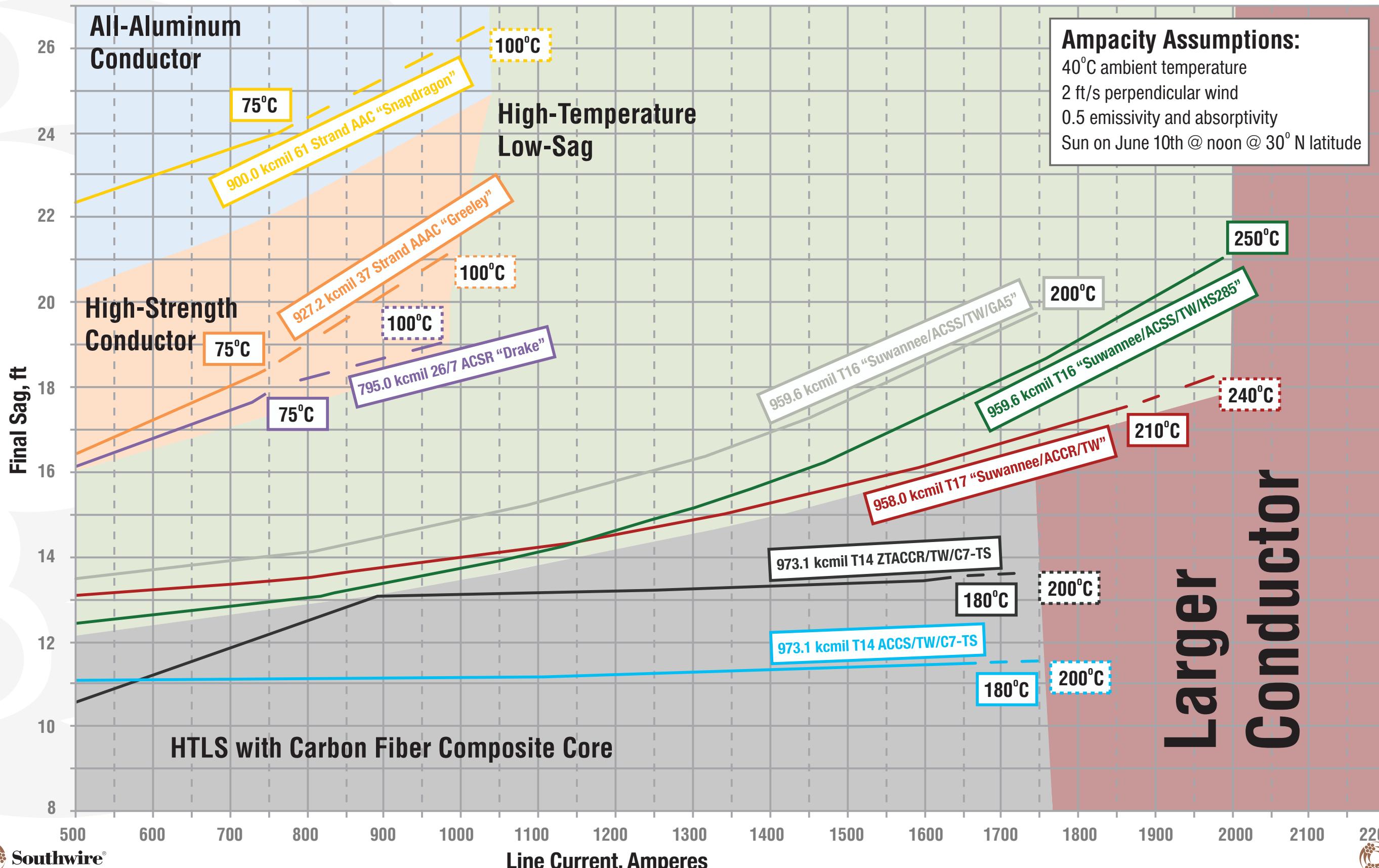
Using the C⁷® overhead conductor solution, the sag in the 1,840-ft span decreased by 66% compared to the existing Drake. Conductor weight also decreased by 53%.

Conductor Type	Size kcmil	Stranding/ Type No.	Outside Diameter in	Weight lb/ft	RBS lb	Evaluation Results					
						Max Tension		Loaded Weight lb/ft	Cond. Temp. °C	Current A	Final Sag ft
						lb	%RBS				
ACSR*	795.0	26/7	1.108	1.093	31,500	12,480	40%	2.963	100	994	98.01
ACCS/TW/C7-TS	477.0	23	0.818	0.511	29,100	12,027	41%	2.128	180	1049	33.59

*Sag-tension results assume movement of the structure and use of existing Drake

COMPARING THE ALTERNATIVES

Conductor Performance Map, 1.108" OD, 800-ft RS, NESC "Medium", NESC Tension Limits



Shaped Wire Concentric-Lay-Stranded Compact Aluminum Conductor, Composite Supported (ACCS/TW/C⁷-TS)

Code Word	Conductor Size, kcmil	Type No.	Cross-Sectional Area, in ²		Layers of Al-Zr	Stranding		Diameter		Weight/1000 feet		
			Al-Zr	Total		No. of Al-Zr Strands	C7 Strands, in	C7 Core, in	Complete Conductor, in	Al-Zr, lb	C7, lb	Total, lb
Fundy/TW	203.2	43	0.1596	0.2280	1	8	7 x 0.1115	0.3346	0.585	194.2	48.2	242.4
Shenandoah/TW	266.8	21	0.2095	0.2533	1	8	7 x 0.0892	0.2677	0.608	255.0	30.9	285.8
Olympic/TW	325.0	17	0.2553	0.2990	2	20	7 x 0.0892	0.2677	0.671	309.2	30.9	340.1
Wrangell/TW	336.4	17	0.2642	0.3080	2	20	7 x 0.0892	0.2677	0.681	320.1	30.9	351.0
Badlands/TW	336.4	22	0.2642	0.3218	2	20	7 x 0.1024	0.3071	0.685	320.1	40.6	360.7
Andes/TW	397.5	14	0.3122	0.3560	2	18	7 x 0.0892	0.2677	0.710	378.1	30.9	408.9
Joshua Tree/TW	397.5	16	0.3122	0.3627	2	18	7 x 0.0958	0.2874	0.718	373.5	35.6	409.1
Sequoia/TW	397.5	22	0.3122	0.3806	2	18	7 x 0.1115	0.3346	0.738	378.1	48.2	426.3
Rogers/TW	477.0	13	0.3746	0.4251	2	18	7 x 0.0958	0.2874	0.778	447.4	35.6	483.3
Yosemite/TW	477.0	15	0.3746	0.4322	2	18	7 x 0.1024	0.3071	0.787	453.7	40.6	494.3
Capitol Reef/TW	477.0	23	0.3746	0.4601	2	20	7 x 0.1247	0.3740	0.820	450.4	60.2	510.6
Tortugas/TW	636.0	10	0.4995	0.5500	2	20	7 x 0.0958	0.2874	0.880	596.7	35.6	632.3
Yellowstone/TW	636.0	12	0.4995	0.5571	2	16	7 x 0.1024	0.3071	0.887	605.4	40.6	646.0
Glacier/TW	636.0	15	0.4995	0.5762	2	20	7 x 0.1181	0.3543	0.905	605.2	54.1	659.2
Carlsbad/TW	636.0	22	0.4995	0.6100	2	20	7 x 0.1417	0.4252	0.937	605.2	77.8	683.0
Congaree/TW	641.7	11	0.5040	0.5616	2	16	7 x 0.1024	0.3071	0.890	610.8	40.6	651.4
Vinson/TW	714.0	10	0.5608	0.6184	2	16	7 x 0.1024	0.3071	0.933	669.9	40.6	710.5
Kilimanjaro/TW	795.0	7	0.6244	0.6682	2	20	7 x 0.0892	0.2677	0.962	745.1	30.9	776.0
Alps/TW	795.0	9	0.6244	0.6820	2	20	7 x 0.1024	0.3071	0.974	756.5	40.6	797.1
Wind Cave/TW	795.0	12	0.6244	0.7011	2	20	7 x 0.1181	0.3543	0.990	756.5	54.1	810.5
Denali/TW	795.0	16	0.6244	0.7268	2	20	7 x 0.1365	0.4094	1.010	747.0	72.2	819.2
Rocky/TW	795.0	22	0.6244	0.7607	2	24	7 x 0.1575	0.4724	1.044	756.3	96.1	852.4
Crater Lake/TW	954.0	7	0.7493	0.7997	3	34	7 x 0.0958	0.2874	1.058	898.6	35.6	934.1
Grand Canyon/TW	954.0	10	0.7493	0.8260	3	34	7 x 0.1181	0.3543	1.072	899.4	54.1	953.5
Fuji/TW	954.0	12	0.7493	0.8421	2	20	7 x 0.1299	0.3898	1.077	907.8	65.4	973.2
Jasper/TW	954.0	16	0.7493	0.8680	2	22	7 x 0.1470	0.4409	1.104	896.4	83.7	980.1
Arches/TW	954.0	20	0.7493	0.8972	2	20	7 x 0.1640	0.4921	1.126	907.8	104.3	1012.0
Everglades/TW	973.1	14	0.7643	0.8747	2	20	7 x 0.1417	0.4252	1.108	925.9	77.8	1003.8
Big Bend/TW	1033.5	5	0.8117	0.8555	3	34	7 x 0.0892	0.2677	1.093	972.5	30.9	1003.4
Lassen/TW	1033.5	7	0.8117	0.8693	3	34	7 x 0.1024	0.3071	1.103	973.4	40.6	1014.0
Tahoe/TW	1033.5	11	0.8117	0.8972	3	34	7 x 0.1247	0.3740	1.118	980.9	60.2	1041.2
Samoa/TW	1033.5	13	0.8117	0.9141	2	22	7 x 0.1365	0.4094	1.130	970.1	72.2	1042.3
Cook/TW	1113.0	5	0.8741	0.9179	3	30	7 x 0.0892	0.2677	1.125	1047.3	30.9	1078.2
Blanc/TW	1113.0	7	0.8741	0.9318	3	34	7 x 0.1024	0.3071	1.139	1048.3	40.6	1088.9
Niagara/TW	1113.0	10	0.8741	0.9596	3	34	7 x 0.1247	0.3740	1.155	1049.3	60.2	1109.6
Gannett/TW	1113.0	13	0.8741	0.9846	3	38	7 x 0.1417	0.4252	1.181	1050.9	77.8	1128.7
Washington/TW	1192.5	5	0.9366	0.9804	3	34	7 x 0.0892	0.2677	1.166	1122.1	30.9	1153.0
Elbert/TW	1192.5	7	0.9366	1.0050	3	34	7 x 0.1115	0.3346	1.184	1123.2	48.2	1171.4
Kings Canyon/TW	1192.5	10	0.9366	1.0294	3	34	7 x 0.1299	0.3898	1.203	1124.3	65.4	1189.7
Acadia/TW	1192.5	13	0.9366	1.0554	3	38	7 x 0.1470	0.4409	1.223	1125.9	83.7	1209.7
Redwood/TW	1233.6	7	0.9689	1.0373	3	38	7 x 0.1115	0.3346	1.206	1161.9	48.2	1210.1
Mesa Verde/TW	1233.6	10	0.9689	1.0617	3	38	7 x 0.1299	0.3898	1.221	1163.0	65.4	1228.5
Biscayne/TW	1233.6	13	0.9689	1.0963	3	38	7 x 0.1522	0.4567	1.245	1164.7	89.8	1254.5
Saguaro/TW	1272.0	5	0.9990	1.0495	3	38	7 x 0.0958	0.2874	1.211	1196.9	35.6	1232.5
Sierra Nevada/TW	1272.0	7	0.9990	1.0674	3	38	7 x 0.1115	0.3346	1.224	1198.1	48.2	1246.3
Eldorado/TW	1272.0	10	0.9990	1.1014	3	38	7 x 0.1365	0.4094	1.244	1199.3	72.2	1271.4
Voyageurs/TW	1272.0	13	0.9990	1.1264	3	39	7 x 0.1522	0.4567	1.259	1201.0	89.8	1290.8
Cascades/TW	1351.5	7	1.0615	1.1382	3	38	7 x 0.1181	0.3543	1.264	1273.0	54.1	1327.0
Banff/TW	1351.5	10	1.0615	1.1639	3	42	7 x 0.1365	0.4094	1.278	1274.2	72.2	1346.4
Elbrus/TW	1351.5	13	1.0615	1.1978	3	42	7 x 0.1575	0.4724	1.299	1276.1	96.1	1372.2
Bryce Canyon/TW	1590.0	7	1.2488	1.3342	3	36	7 x 0.1247	0.3740	1.357	1497.6	60.2	1557.8
Adirondack/TW	1590.0	10	1.2488	1.3762	3	38	7 x 0.1522	0.4567	1.386	1499.1	89.8	1588.9
Zion/TW	1590.0	12	1.2488	1.3967	3	42	7 x 0.1640	0.4921	1.405	1509.4	104.3	1613.7
Teton/TW	1780.0	5	1.3980									

Shaped Wire Concentric-Lay-Stranded Compact Thermal-Resistant Aluminum Conductor, Composite Reinforced (ZTACCR/TW/C⁷[®]-TS)

Code Word	Conductor Size, kcmil	Type No.	Cross-Sectional Area, in ²		Layers of Al-Zr	Stranding		Diameter		Weight/1000 feet		
			Al-Zr	Total		No. of Al-Zr Strands	C7 Strands, in	C7 Core, in	Complete Conductor, in	Al-Zr, lb	C7, lb	Total, lb
Fundy/TW	203.2	43	0.1596	0.2280	1	8	7 x 0.1115	0.3346	0.585	193.2	48.2	241.4
Shenandoah/TW	266.8	21	0.2095	0.2533	1	8	7 x 0.0892	0.2677	0.608	253.7	30.9	284.5
Olympic/TW	325.0	17	0.2553	0.2990	2	20	7 x 0.0892	0.2677	0.671	307.7	30.9	338.5
Wrangell/TW	336.4	17	0.2642	0.3080	2	20	7 x 0.0892	0.2677	0.681	318.5	30.9	349.3
Badlands/TW	336.4	22	0.2642	0.3218	2	20	7 x 0.1024	0.3071	0.685	318.5	40.6	359.1
Andes/TW	397.5	14	0.3122	0.3560	2	18	7 x 0.0892	0.2677	0.710	376.1	30.9	407.0
Joshua Tree/TW	397.5	16	0.3122	0.3627	2	18	7 x 0.0958	0.2874	0.718	371.6	35.6	407.1
Sequoia/TW	397.5	22	0.3122	0.3806	2	18	7 x 0.1115	0.3346	0.738	376.1	48.2	424.3
Rogers/TW	477.0	13	0.3746	0.4251	2	18	7 x 0.0958	0.2874	0.778	445.5	35.6	481.0
Yosemite/TW	477.0	15	0.3746	0.4322	2	18	7 x 0.1024	0.3071	0.787	451.3	40.6	491.9
Capitol Reef/TW	477.0	23	0.3746	0.4601	2	20	7 x 0.1247	0.3740	0.820	448.1	60.2	508.3
Tortugas/TW	636.0	10	0.4995	0.5500	2	20	7 x 0.0958	0.2874	0.880	593.6	35.6	629.2
Yellowstone/TW	636.0	12	0.4995	0.5571	2	16	7 x 0.1024	0.3071	0.887	602.2	40.6	642.8
Glacier/TW	636.0	15	0.4995	0.5762	2	20	7 x 0.1181	0.3543	0.905	602.1	54.1	656.1
Carlsbad/TW	636.0	22	0.4995	0.6100	2	20	7 x 0.1417	0.4252	0.937	602.1	77.8	679.9
Congaree/TW	641.7	11	0.5040	0.5616	2	16	7 x 0.1024	0.3071	0.890	607.6	40.6	648.2
Vinson/TW	714.0	10	0.5608	0.6184	2	16	7 x 0.1024	0.3071	0.933	666.4	40.6	707.0
Kilimanjaro/TW	795.0	7	0.6244	0.6682	2	20	7 x 0.0892	0.2677	0.962	741.3	30.9	772.2
Alps/TW	795.0	9	0.6244	0.6820	2	20	7 x 0.1024	0.3071	0.974	752.6	40.6	793.2
Wind Cave/TW	795.0	12	0.6244	0.7011	2	20	7 x 0.1181	0.3543	0.990	752.6	54.1	806.6
Denali/TW	795.0	16	0.6244	0.7268	2	20	7 x 0.1365	0.4094	1.010	743.1	72.2	815.3
Rocky/TW	795.0	22	0.6244	0.7607	2	24	7 x 0.1575	0.4724	1.044	752.4	96.1	848.5
Crater Lake/TW	954.0	7	0.7493	0.7997	3	34	7 x 0.0958	0.2874	1.058	894.0	35.6	929.5
Grand Canyon/TW	954.0	10	0.7493	0.8260	3	34	7 x 0.1181	0.3543	1.072	894.8	54.1	948.9
Fuji/TW	954.0	12	0.7493	0.8421	2	20	7 x 0.1299	0.3898	1.077	903.1	65.4	968.5
Jasper/TW	954.0	16	0.7493	0.8680	2	22	7 x 0.1470	0.4409	1.104	891.8	83.7	975.5
Arches/TW	954.0	20	0.7493	0.8972	2	20	7 x 0.1640	0.4921	1.126	903.1	104.3	1007.4
Everglades/TW	973.1	14	0.7643	0.8747	2	20	7 x 0.1417	0.4252	1.108	921.2	77.8	999.0
Big Bend/TW	1033.5	5	0.8117	0.8555	3	34	7 x 0.0892	0.2677	1.093	967.5	30.9	998.4
Lassen/TW	1033.5	7	0.8117	0.8693	3	34	7 x 0.1024	0.3071	1.103	968.5	40.6	1009.1
Tahoe/TW	1033.5	11	0.8117	0.8972	3	34	7 x 0.1247	0.3740	1.118	975.9	60.2	1036.1
Samoa/TW	1033.5	13	0.8117	0.9141	2	22	7 x 0.1365	0.4094	1.130	965.1	72.2	1037.3
Cook/TW	1113.0	5	0.8741	0.9179	3	30	7 x 0.0892	0.2677	1.125	1041.9	30.9	1072.8
Blanc/TW	1113.0	7	0.8741	0.9318	3	34	7 x 0.1024	0.3071	1.139	1042.9	40.6	1083.5
Niagara/TW	1113.0	10	0.8741	0.9596	3	34	7 x 0.1247	0.3740	1.155	1044.0	60.2	1104.2
Gannett/TW	1113.0	13	0.8741	0.9846	3	38	7 x 0.1417	0.4252	1.181	1045.5	77.8	1123.3
Washington/TW	1192.5	5	0.9366	0.9804	3	34	7 x 0.0892	0.2677	1.166	1116.4	30.9	1147.2
Elbert/TW	1192.5	7	0.9366	1.0050	3	34	7 x 0.1115	0.3346	1.184	1117.4	48.2	1165.7
Kings Canyon/TW	1192.5	10	0.9366	1.0294	3	34	7 x 0.1299	0.3898	1.203	1118.5	65.4	1183.9
Acadia/TW	1192.5	13	0.9366	1.0554	3	38	7 x 0.1470	0.4409	1.223	1120.2	83.7	1203.9
Redwood/TW	1233.6	7	0.9689	1.0373	3	38	7 x 0.1115	0.3346	1.206	1156.0	48.2	1204.2
Mesa Verde/TW	1233.6	10	0.9689	1.0617	3	38	7 x 0.1299	0.3898	1.221	1157.1	65.4	1222.5
Biscayne/TW	1233.6	13	0.9689	1.0963	3	38	7 x 0.1522	0.4567	1.245	1158.8	89.8	1248.6
Saguaro/TW	1272.0	5	0.9990	1.0495	3	38	7 x 0.0958	0.2874	1.211	1190.8	35.6	1226.3
Sierra Nevada/TW	1272.0	7	0.9990	1.0674	3	38	7 x 0.1115	0.3346	1.224	1191.9	48.2	1240.2
Eldorado/TW	1272.0	10	0.9990	1.1014	3	38	7 x 0.1365	0.4094	1.244	1193.1	72.2	1265.3
Voyageurs/TW	1272.0	13	0.9990	1.1264	3	39	7 x 0.1522	0.4567	1.259	1194.8	89.8	1284.6
Cascades/TW	1351.5	7	1.0615	1.1382	3	38	7 x 0.1181	0.3543	1.264	1266.4	54.1	1320.5
Banff/TW	1351.5	10	1.0615	1.1639	3	42	7 x 0.1365	0.4094	1.278	1267.7	72.2	1339.8
Elbrus/TW	1351.5	13	1.0615	1.1978	3	42	7 x 0.1575	0.4724	1.299	1269.5	96.1	1365.6
Bryce Canyon/TW	1590.0	7	1.2488	1.3342	3	36	7 x 0.1247	0.3740	1.357	1489.9	60.2	1550.2
Adirondack/TW	1590.0	10	1.2488	1.3762	3	38	7 x 0.1522	0.4567	1.386	1491.4	89.8	1581.2
Zion/TW	1590.0	12	1.2488	1.3967	3	42	7 x 0.1640	0.4921	1.405	1501.7	104.3	1606.0
Teton/TW	1780.0	5										



Southwire®

C⁷[®] OVERHEAD CONDUCTOR BROCHURE

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