HEAD FOR THE HILL

JESSICA BRIDGER

LEFT
The design of ski areas is intensive and highly specialized.

ECOSIGN HAS BEEN DESIGNING SKI RESORTS FOR 40 YEARS, BUT A WARMING PLANET AND NEW MARKETS IN ASIA KEEP THE WORK INTERESTING.

BY JESSICA BRIDGER

IT IS LIKELY YOU HAVE NEVER HEARD OF PAUL MATHEWS, BUT IF YOU SKI IT IS PROBABLE THAT YOU HAVE BEEN ON A SLOPE THAT HE HAD A HAND IN DESIGNING. In 1975, he founded Ecosign Mountain Resort Planners, "Ecosign" being a portmanteau of ecology and design. Whistler, the downhill and backcountry ski hub in British Columbia, has been his home turf since the 1970s, and Ecosign has worked on more than 400 ski resorts around the world.

Mathews was responding to the state of skiing in the 1970s when he founded Ecosign. Ski areas had evolved over the years, some growing from adhoc paths down the sides of mountains into massive areas, choked by car traffic on the weekends, full of stairs and narrow, poorly designed ski slopes, or *pistes,* with disorganized ski villages at their base. Infrastructure was insufficient; environmental degradation was rife. Some resorts were made by tearing

BELOW
Andermatt's development depends on better linkages of the ski areas.

into the landscape, moving large amounts of rock and soil, cutting excessive numbers of trees, ignoring flora and fauna. Few undertook adequate transportation planning to handle weekly visitor flows. Other ski areas suffered from fragmented ownership, with multiple operators in single small town or village settings, hampering the investment needed to keep facilities modern and ensure longevity and employment. Four decades after founding Ecosign, Mathews knows what to do with both challenges—how to plan for sustainable futures and growth and how to establish completely new ski resorts in places that have none. The company is about 20 people and includes landscape architects, architects, engineers, soil scientists, and MBAs, among others, who work around the world from Ecosign's base at Whistler. "There is lot of work in China, the Balkans, Turkey—anywhere where they have mountains, snow, and incomes that are rising," Mathews says.

Skiing has a way of generating obsession. It is an all-encompassing activity, requiring complete attention with the reward of adrenaline, all in a sublime landscape. The pitch and roll of a well-designed piste can be a magical thing. Although many resorts tout their kilometers of ski slopes, depicted on maps as simple color-coded lines, the actual quality is much more important than the quantity. This quality is determined by the mountain, which cannot be moved (much), as well as through proper planning and, later, maintenance and grooming.

What is a weekend sport for some can become a consuming passion for others. A ski enthusiast since childhood, Mathews graduated from the University of Washington in Seattle with a degree in forest ecology and two years of landscape architecture study under his belt. He had dreamed the dream of any ski obsessive—skiing all the time, whenever or wherever. He realized the dream not by becoming a ski bum, minimally employed and chasing powder, but by founding Ecosign. He had a vision—to make skiing better, more balanced ecologically, and more sustainable, all years before that was a buzzword. Ski resorts require holistic thinking, especially if they are to be sustainable for the people and towns that they're in, the visitors, and the environment.

The roots of ski-resort design are the slopes and the lifts that serve them. "We try to not do heavy construction and just use natural terrain, use re-vegetation, create drainage," Mathews says. Under that rubric, the mountain's given conditions determine where slopes can and cannot run, following the Ecosign method. "One of the first things we do on any project is we get an environmental overlay," including flora and fauna. "For 45 years we've taken the position to avoid any rare or endangered species habitat," says Mathews, long before legislation required it in many places.

The design process for the ski slopes in most Ecosign projects begins with topography, hydrology, soil, and solar-exposure mapping. They both source and commission studies, and use tools such as GIS and LIDAR mapping. "We need to know as much as we can; the quality of mapping and analysis is the foundation of everything

TOP LEFT
Following the path of Paul Mathews is something many skiers have done without knowing.

ABOVE
A site visit to the Andermatt-Sedrun project revealed new rail connections and a view of the fabled Gemsstock mountain, home to Andermatt's expert terrain.

JESSICA BRIDGER

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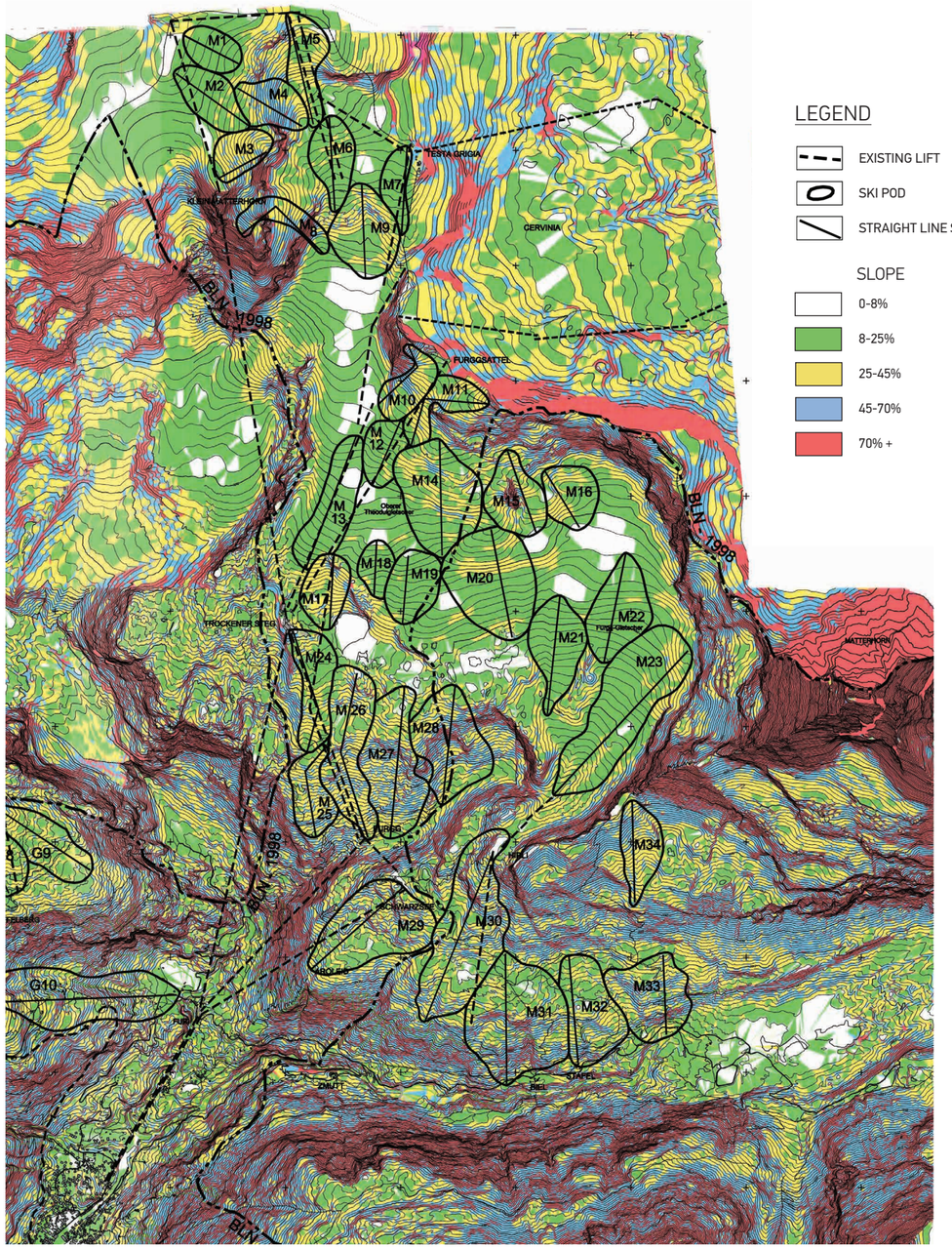
KLEIN MATTERHORN – SLOPE/TERRAIN CAPACITY ANALYSIS



LEGEND

- EXISTING LIFT
- SKI POD
- STRAIGHT LINE SLOPE

SLOPE

- 0-8%
- 8-25%
- 25-45%
- 45-70%
- 70% +

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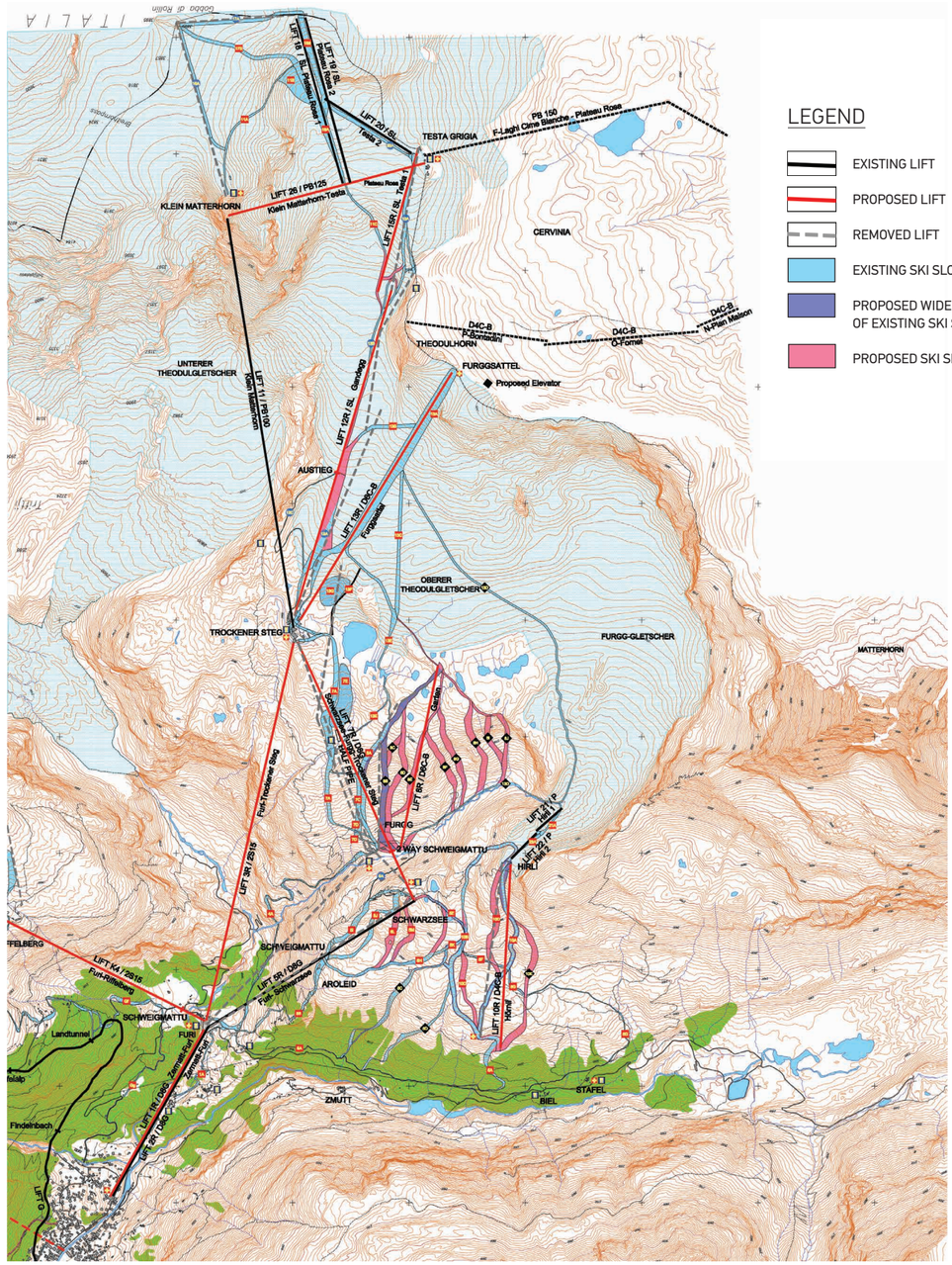
KLEIN MATTERHORN – SKI AREA MASTER PLAN



LEGEND

- EXISTING LIFT
- PROPOSED LIFT
- REMOVED LIFT
- EXISTING SKI SLOPE
- PROPOSED WIDENING OF EXISTING SKI SLOPE
- PROPOSED SKI SLOPE

ECOSIGN

"WE'RE NOT DESIGNING HIGHWAYS—THOSE ARE THE WORST."

—PAUL MATHEWS

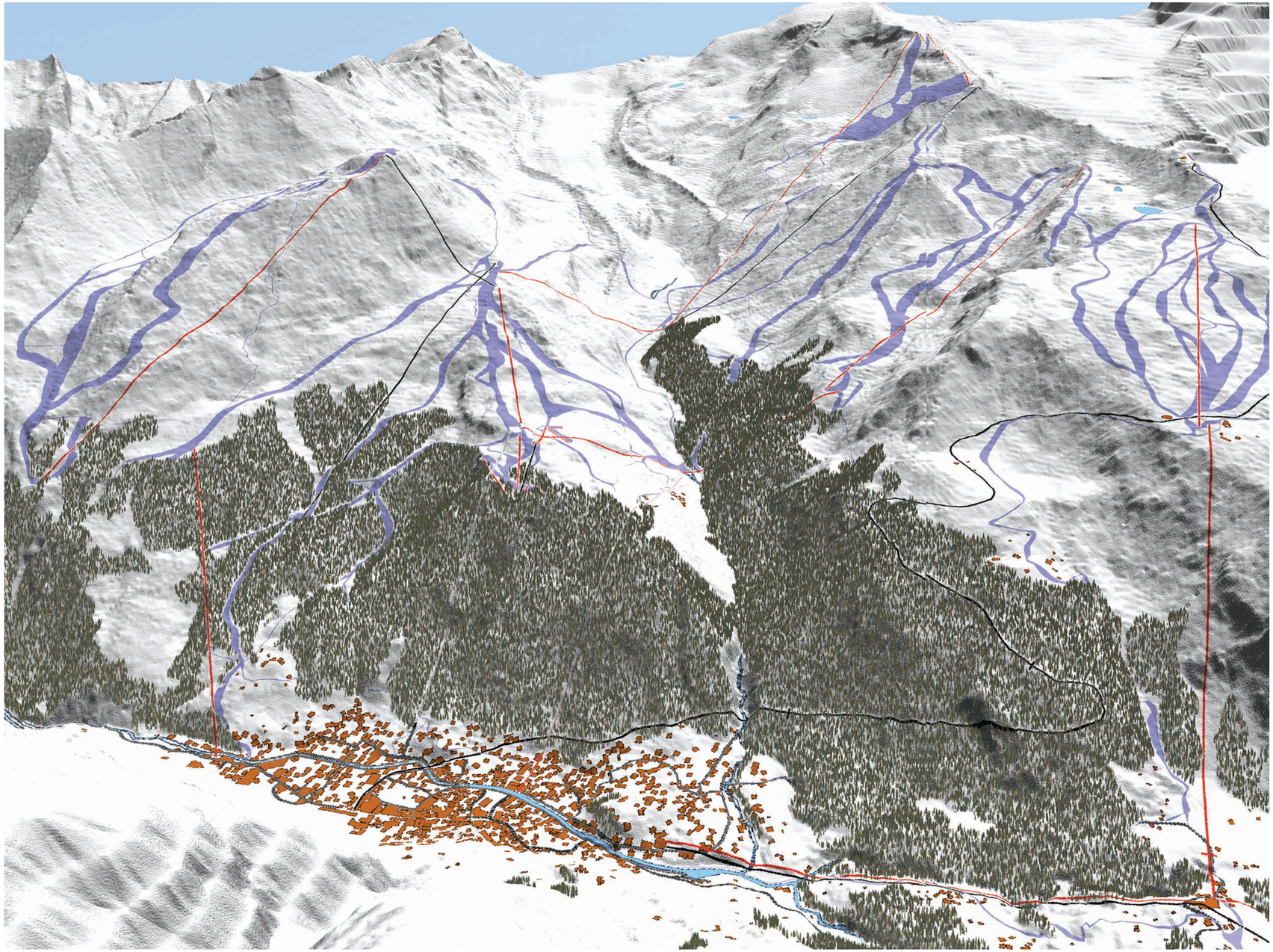
we do," says Ryley Thiessen, the president of Ecosign and a landscape architect who will lead the next generation of the company. In the following step, they study the topography to identify what Ecosign refers to as "terrain pods" where slopes can be laid out. In plan, the pods look like blobs drawn over the topography, and designers sketch out the possible ski slopes, informed by the mapping. Glacial till is most often their base. Solar exposure can make or kill a slope, as the sun at full exposure can at best create slush and at worst destroy ski-slope snow. "We look at the amount of terrain, the soil, then we have one to seven classes of skiers. We have a maximum steepness for those abilities," Mathews says. "We assume a maximum of 25 percent of the terrain pod will be usable." From this quarter, a rough design for the ski slopes can be drawn, and lifts specified based on the expected number of skiers per hour.

Following these rounds of analysis and initial design, the Ecosign team heads to the site for an on-slope evaluation, armed with inclinometers that measure the angles of the slopes and GPS units to mark up their maps and check their

OPPOSITE
Early mornings reveal the hard work of the maintenance teams—and reward with a view to Parsenn and the Swiss Alps beyond.

JESSICA BRIDGER

ZERMATT – ROTHORN



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ZERMATT – VILLAGE THREE-DIMENSIONAL VIEW

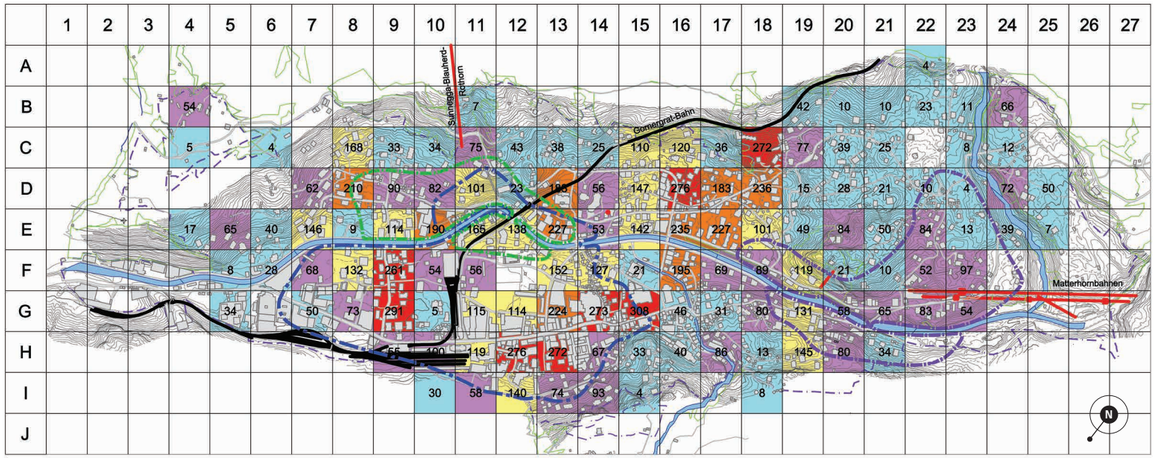
ABOVE
Zermatt is a sophisticated and well-planned ski area, and includes a car-free town.

OPPOSITE
Ecosign's plan for Zermatt Rothorn features connections up, down, and across.

designs in person and by hand. The blend of digital and analog tools runs throughout their design process. "It is always nice to start by hand, sketching with a marker to get a good feel for it," Thiessen says. Thiessen grew up in rural Saskatchewan and went to the University of Guelph to study landscape architecture with a focus on large-scale resort planning after getting bitten by the ski bug. Even before graduating he knew he wanted to work for Ecosign, and persistence got him a job.

"We're not designing highways—those are the worst," Mathews says, referring to the road-like passages, sadly common in many resorts, where one is technically skiing but with few options other than to simply go straight. No perfect sine-wave turns, no carving, no variation. This can be boring, or as boring as skiing can get. "We design things that move left and right, and where the terrain rolls, with vertical and horizontal movement," Mathews says.

ZERMATT – COMMERCIAL BED DENSITY ANALYSIS



LEGEND

- SKIER WALKING DISTANCE TO GOTTHARD–GORNERTRAT–BAHN TRAIN STATION
- SKIER WALKING DISTANCE TO SUNNEGA UNDERGROUND TRAIN
- SKIER WALKING DISTANCE TO MATTERHORN-BAHN/SCHLUMATTEN
- EXISTING SKI LIFTS
- RAILWAYS

BEDS PER HECTARE

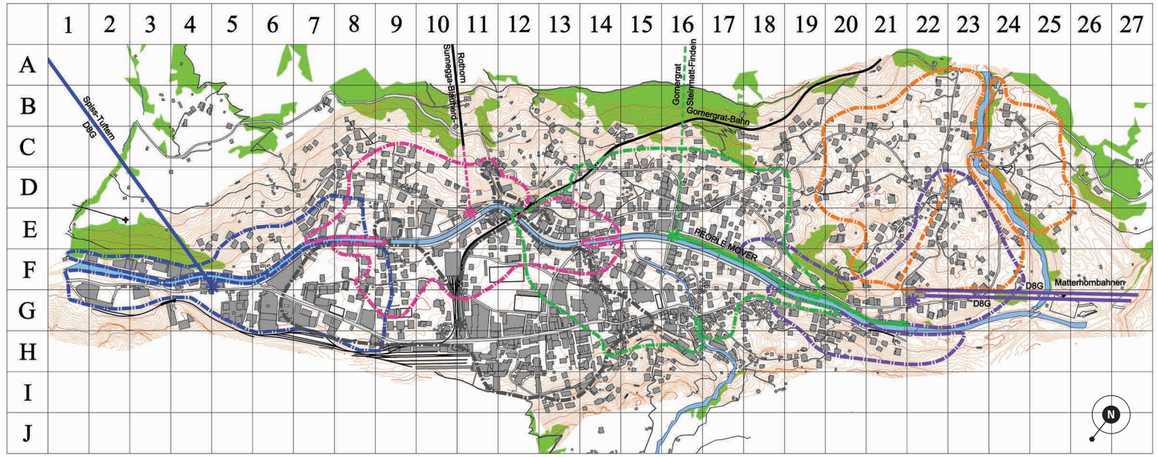
- 1–50
- 51–100
- 101–175
- 176–250
- 250+

ECOSIGN. TOP: JESSICA BRIDGER. BOTTOM

"Skiers spend eight hours on the mountain, maximum," Mathews says. "The other 16 hours are the groomers," he continues, referring to the teams that drive the heavy-duty vehicles that push and drag the snow into form on the ski slopes. It takes a lot of work and fuel to groom ski slopes. This grooming leaves "corduroy" lines behind, a blanket of ridges that the first skiers of the morning delight in marking up. If a layer of light, dry snow falls over the corduroy, it is like skiing over champagne bubbles, and nearly as euphoric as downing a magnum with good friends. The maintenance of a mountain is inherent to its skiing quality. To save on fuel costs and crew hours, ski slopes can be groomed to have a minimal width, often between 10 and 15 meters, depending on the steepness. This is not wide enough for enjoyment, as anyone who has ever flown sideways, across, up, and down a wide groomed slope will attest. It also makes for congestion. Ecosign aims for 600 to 800 skiers per hour, and given the steepness of a slope, the width must be sufficient to accommodate this number, both in Ecosign's design and in the ongoing grooming on the mountain. The wider the better, and slopes are never wide enough for some. Watching one of the world's best freeskiers, Candide Thovex, in the movie *Few Words* clarifies this yearning for freedom perfectly.

Switzerland is an early example of looking at resorts holistically, from business plan to slope

ZERMATT – POTENTIAL VILLAGE LIFT LOCATIONS



WWW.SHUTTERSTOCK.COM/PETR POHUDKA

ABOVE
Ecosign's holistic approach includes detailed analysis of the human factors.

OPPOSITE
Zermatt has about three million visitors a year, which requires complex analysis and planning.

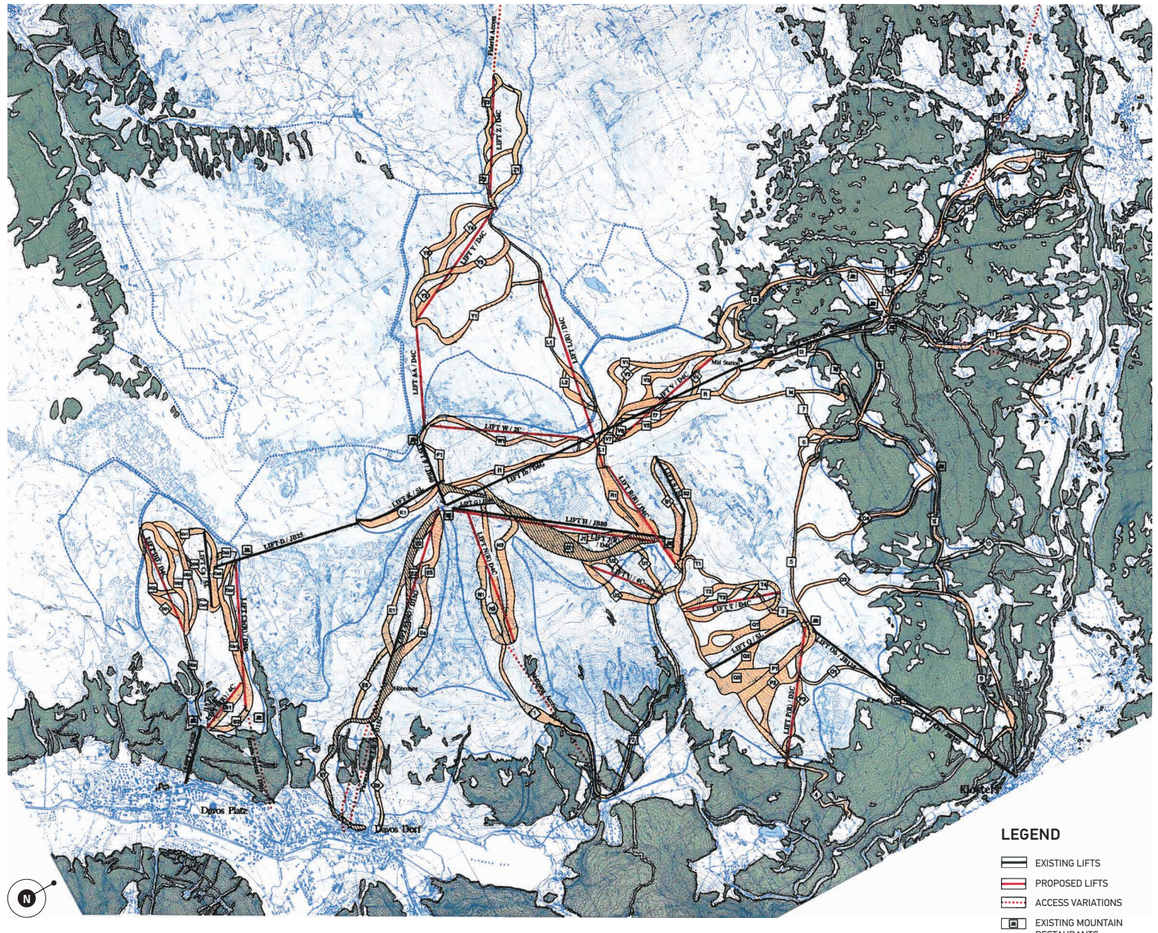
LEGEND

- EXISTING TRANSPORT SYSTEMS
- SKIER WALKING DISTANCE TO GOTTHARD–GORNERTRAT–BAHN TRAIN STATION
- SKIER WALKING DISTANCE TO MATTERHORN-BAHN-SCHLUMATTEN
- SKIER WALKING DISTANCE TO WINKELMATTEN AUTOMATIC ROLLING CARPET
- SKIER WALKING DISTANCE TO SPISS–TUFTERN 8 PASSENGER GONDOLA
- SKIER WALKING DISTANCE TO UNDERGROUND TRAIN/STEINMATTE-FINDELN
- SKIER WALKING DISTANCE TO SUNNEGGA WITH AUTOMATIC ROLLING CARPET IMPROVEMENTS

maintenance. Zermatt lies down a narrow valley in the southwest of Switzerland, with arrival via the Matterhorn Gotthard Bahn, a partial cog railway that rises 1,000 meters. The valley is steep and deep, and it is difficult to imagine why people settled the village hundreds of years ago. One of the most famous mountains, the Matterhorn, lies at the end of it. In the 2017–2018 season, more than 2.2 million people visited Zermatt, which has a population of about 5,800. Skiers and nonskiers alike come for the spectacular glacier landscape crowned by the Matterhorn. The entire town is car-free, with taxis, electric buses, and feet providing locomotion. Connections to public transportation are excellent, and all must use the train, including those who come by car, leaving it a few miles below the town. Multiple glaciers and 38 mountains with peaks above 4,000 meters (13,000 feet) are visible. The ski season never ends, thanks to summer glacier skiing, and about 360 kilometers of slopes cater to all sorts of ski enthusiasts. Zermatt Bergbahnen, among Switzerland's largest mountain operators, runs the ski area.

After visiting in the 1970s and drawing inspiration from the car-free Swiss idyll, Mathews later came with Ecosign to Zermatt to work, helping to persuade what was then three smaller lift companies to join forces—and better connect the mountain. In 2002, a master plan by Ecosign set groundwork for some of Zermatt's most impressive lifts, including the 3S cable car connection to Klein Matterhorn at the top of the resort, which opened for the 2018–2019 ski season. The lift's terminus is at 3,821 meters (12,536 feet), which would make it the highest 3S cableway and one of the most efficient lift types available. It is also part of a significant project that will create a continu-

DAVOS-PARSENN – MASTER PLAN CONCEPT



ous cable car link between Zermatt and Italy, referred to as an "Alpine Crossing." Although there are some existing connections through ski slopes and chair or T-bar lifts, and the signage includes Swiss, Italian, and European Union flags as you move along or over international borders, this cable car link will open up a new way for skiers and nonskiers alike to cross the Alps. Zermatt offers quite a bit in the way of Alpine lifestyle. Art galleries, cultural events, a variety of restaurants, and shopping transformed the village into a tourist paradise years ago. Even though it would be easy to mock this characterization, it provides meaningful employment for many and supports a year-round life for the village.

Ski resorts are so much more than their slopes, especially now. "A lot of people who don't ski come for the food, the experience, dining, shopping," Thiessen says. Ecosign does not place these concerns below those of the skiers. It would be easy to assume that the priority is the slopes and that everything else is secondary. But skiers also need to eat and sleep and sometimes do something other than ski. Mathews is clear on the need to think about the entire resort, and this need is embedded in the firm's projects through analysis of existing offerings and by making suggestions for development. The more general appeal a resort has, the better it serves all its visitors for their full on- and off-slope day. Mountains also draw many nonskiers, simply for their unique character or particular bonhomie.

Accounting for the number of possible visitors comes from two sources—day tourists and those who stay overnight—and day tourists have different priorities from overnighters. Ecosign counts both, examining parking and public transport along with the exact numbers of beds available to guests in both hotels and rental apartments. Each group has separate priorities, but both come for the quality of the resort, including its transportation and accommodation options. Ecosign produces master plans and analyses that provide a comprehensive understanding of all aspects of ski resort development—the volume of skiers on a particular *piste*, the number of mountain restaurant seats available, and the number of vehicles needing places to park.

Still, the most important element of any resort is the quality of its ski slopes. Some of the nicest

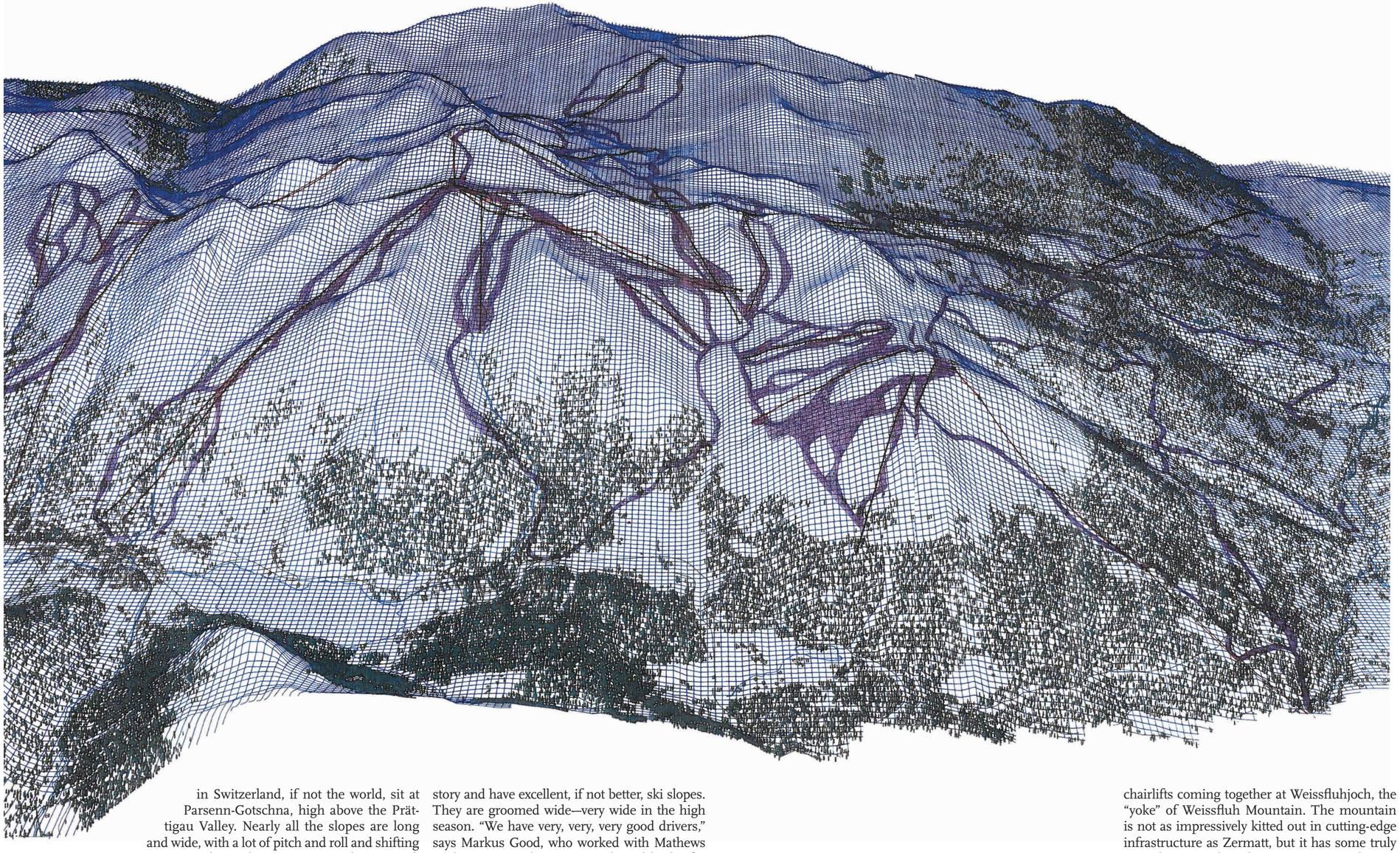
ABOVE
Looking down from Gotschna Mountain toward Klosters, into the history of skiing.

OPPOSITE
A mid-1990s plan for Parsenn shows the wide rolling ski slopes that Davos Klosters is known for.

JESSICA BRIDGER

ECOSIGN

DAVOS-PARSENN – MASTER PLAN CONCEPT (TERRAIN MODEL: WEST VIEW)



ABOVE
The Furka-Zipper at Parsenn is a major improvement in linking Davos with Klosters.

OPPOSITE
The slopes of Parsenn are famously wide with a lot of desirable pitch and roll.

in Switzerland, if not the world, sit at Parsenn-Gotschna, high above the Prättigau Valley. Nearly all the slopes are long and wide, with a lot of pitch and roll and shifting views. In the mid-1990s, Ecosign began work at Parsenn in Davos, now famous for the World Economic Forum but actually the birthplace of Swiss skiing. Although Zermatt and Saint Moritz are more famous resorts, Davos and its sister village, Klosters, are part of the sport's origin story and have excellent, if not better, ski slopes. They are groomed wide—very wide in the high season. "We have very, very, very good drivers," says Markus Good, who worked with Mathews in the 1990s and serves as technical leader for the privately owned Davos Klosters Bergbahnen AG. He says, "We were the first in the Alps to have permanent snowmaking." Mathews's work at Parsenn installed some of the most important connections now on the mountain, with three chairlifts coming together at Weissfluhjoch, the "yoke" of Weissfluh Mountain. The mountain is not as impressively kitted out in cutting-edge infrastructure as Zermatt, but it has some truly special runs, and modest improvements keep it competitive and wellregarded.

ECOSIGN

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The metabolism of the mostly small town and village ski areas is easy to mistake at a distance as running on vast reservoirs of wealth. A few places allow for massive profits, but many ski areas are focused more on modest returns and continued investment in their (costly) infrastructure. All resorts are deeply dependent on weather and climate, and in the Alps, any slopes below 2,000 meters have a future clouded by climate change. Some places are already feeling the impact of warmer winters and later snowfall. This change affects people's livelihoods. Future climate shifts could completely reconfigure winter tourism flows—and the associated economic benefit—for the resorts in jeopardy. While places like Zermatt or Parsenn are considered relatively secure owing to their high-altitude slopes, the worry is increasing, and many places are looking to boost their non-snow-sport offerings.

Even as ski equipment has improved, transforming the sport and making it easier and safer, and

SKIERS ALSO NEED TO EAT AND SLEEP AND SOMETIMES DO SOMETHING OTHER THAN SKI.

even as resorts have sought to become more well-rounded, the world has gotten smaller and more full of entertainment options and distractions. Ski areas cannot simply count on their legacies—the best of them never did—but must now compete for goggle time versus screen time and out-of-season beach time.

Change is inevitable for a firm like Ecosign, especially across many years and projects. "This all began in July 1975," Mathews says. "I just had a dream. I cannot describe it in any other way." ●

JESSICA BRIDGER IS A WRITER AND URBANIST.

JESSICA BRIDGER

OPPOSITE
Looking toward Weissfluh mountain, the terrain of Parsenn unfolds.