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SKI AREA FEASIBIILITY STUDY

&

SKI AREA MASTER PLAN

GALICICA | MACEDONIA | MAY 2014

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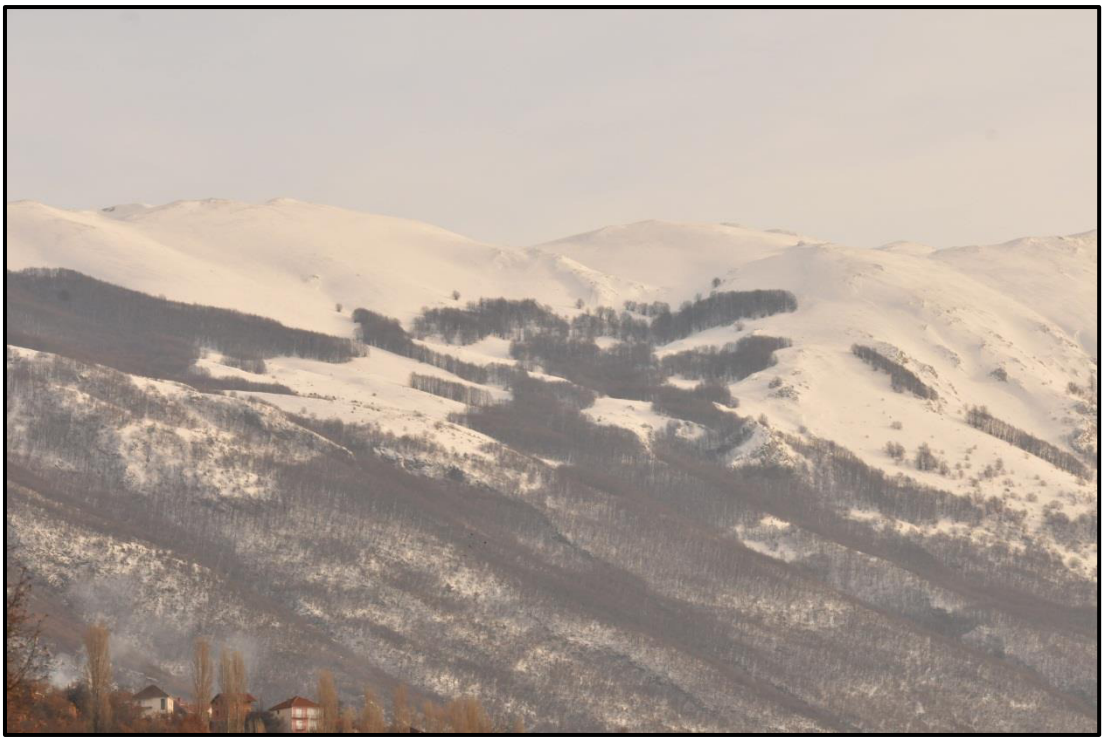
I. INTRODUCTION

.1 Location and Regional Context

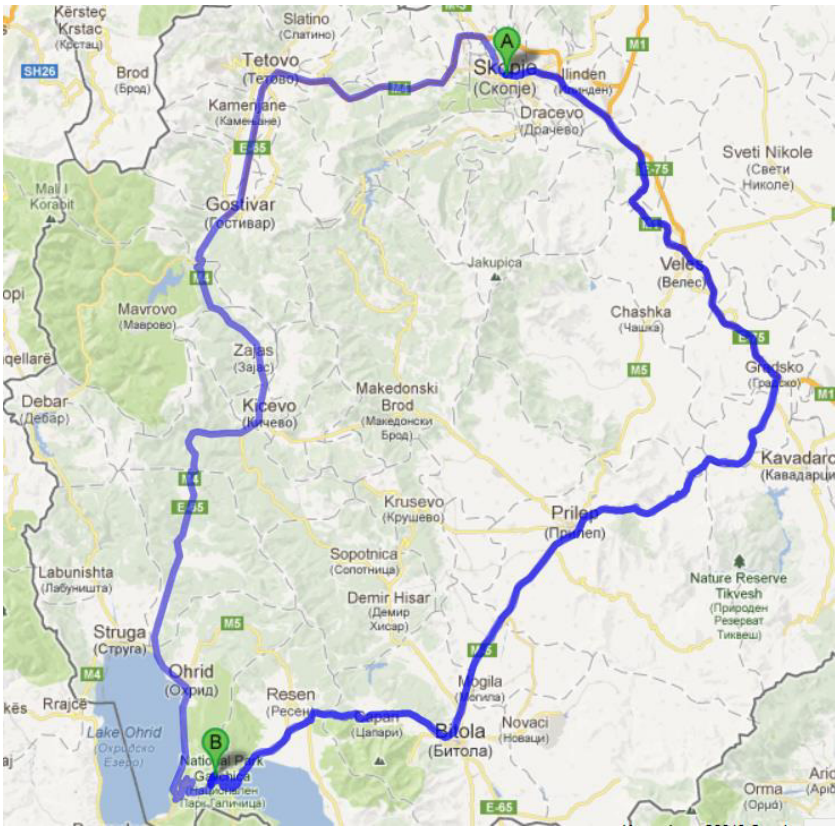
Horwath and Horwath Consulting, in Zagreb, Croatia and Ecosign Mountain Resort Planners Ltd. at Whistler, Canada (together with Ecosign Europa Mountain Recreation Planners GmbH of Wolfurt, Austria as subcontractor) have been assigned by Electricity Transmission System Operator of Macedonia, AD MEPSO -
Skopje, the task of providing professional planning services related to the Drafting of a Feasibility Study for the Development and Construction of a Ski Center in the Galičica National Park.

Ohrid (Macedonian: Охрид) is the biggest city in the Northwest of the National Park laying on the eastern shore of Lake Ohrid in the Republic of Macedonia. It has about 42.000 inhabitants, making it the seventh largest city in the country. The city is the seat of the Ohrid Municipality. Ohrid is notable for having once had 365 churches, one for each day of the year and has been referred to as a "Jerusalem of the Balkans". The city is rich in picturesque houses and monuments, and tourism is predominant. It is located southwest of Skopje, west of Resen and Bitola, close to the border with Albania at an elevation of 695 meters above sea level. Figure I.1 gives an overview of the location of the study area and Figure I.2 illustrates the regional context.



Snow-covered mountains above Lake Ohrid

Galicica National Park can be accessed by road from the capital Skopje (population of ~700.000 in the metropolitan area) either via Tetovo or via Prilep which is approximately a 3 hour drive and a distance of approx. 220-230km.



Road Access from Skopje

Galičica (Macedonian: Галичица) mountain is situated across the border between the Republic of Macedonia and Albania. There is a National park on the Macedonian side of the mountain, situated between the two biggest lakes in the republic: Lake Ohrid and Lake Prespa.

The National Park Galicica was proclaimed in 1958. Today, the National Park Galicica has several international nominations: "Emerald Area", "Significant Plant Area", "Primary Area for Butterflies", and potentially a "NATURA 2000 Area".

Borders of the National Park Gal*ičica with road infrastructure*

The territory of the National Park Galičica is within the administrative borders of the Municipalities of Ohrid and Resen. The area of the National Park is 24.151 ha, of which 17.382 ha (or around 72%) are simultaneously belonging to the World Heritage Ohrid region. The abundance of natural and cultural values, but also the location of the Mountain Galicica between Lake Ohrid and Lake Prespa, contributes to the attractiveness of the National Park for visitors. As part of the wider Ohrid-Prespa region, the National Park is included in the most significant touristic destinations in the Republic of Macedonia.

Beautiful views across the lakes and neighboring mountains can be seen from the Galičica peaks. The highest is peak Magaro (2.254 m).

Panorama of the National Park Galičica with peak Magaro in background

In the 70s and the 80s of the past century, there were attempts to develop infrastructure for winter sports and recreational activities at the location Korita and on the northern slopes of Stara (Old) Galicica, on the Ohrid side, that is, on the slopes below the peaks Lako Signoj and Tomoros on the Prespa side. Namely, by the end of sixties, on Stara Galicica, on the northern slopes of the beech forest under the peak Magaro, one zone was designated as a ski path. Some old barracks were refurbished as accommodation facilities. Since the interest for alpine skiing grew, the enterprise for distribution of electricity constructed two connected buildings for accommodation. In the mid-70s, one additional lodge was built by the Macedonian Youth Hostel Association. Immediately after opening the ski path, national competitions in grand slalom started to be organized. In the meantime, three smaller ski lifts were constructed along the ski path. In the 80s all activities at the locations ceased, and the premises were abandoned. Due to lack of care and maintenance, the old object deteriorated, except for the one part of the barracks built by the enterprise for distribution of electricity. In 2002, the Mountain Sports Club "Magaro" from Ohrid partially refurbished this building and is regularly using it for its own purposes. In 2007, the Club "Magaro", in cooperation with the municipal organization of the Red Cross from Ohrid additionally adapted the building in order to serve as mountain rescue station.

By the end of the 80s, a ski center including a two-seater cableway, 1,1 km long (under the location Krle Gola Buka), and three ski-lifts (under the peak Tomoros) was built at the location Dva Javori (Two Maples). This centre was operational for few years only and today, due to lack of maintenance, is not functional and is completely unattended.

Initiatives to build infrastructure for developing winter tourism in these areas of the National Park have also been instigated later on, such as the example from 2006 when the company "Aquapura" wanted to rehabilitate the ski centre at the location Dva Javori.

Existing Double Chairlift looking towards peak Tomoros

Existing Surface Lift looking towards peak Lako Signoj

This project's objective is to establish a sporting and recreational centre in the National Park Galicica, entailing a construction of a ski centre that would grow and become a large regional ski center. The purpose is to make it a tourist centre for all seasons.

The objective of this part of the project is to draft a Feasibility Study that will explore and establish whether building such a ski center is feasible, and if so, afterwards draft a detailed Master Plan for the future ski center and the surrounding areas, which will be used as guideline for its construction and will help balance all relevant socio-economic, environmental and financial aspects and interests.

This Feasibility Study aims to inventory and analyze the remains of the existing ski center and the skier service facilities for the purpose of comparing them with international standards and to identify potential improvement, revitalization and expansion possibilities. Furthermore a technical assessment of the study area covering the terrain of the National Park will be carried out. The comprehensive analysis will help to identify potential lands for ski area and base area development.

.2 Planning Issues

The successful design and operation of a mountain resort requires a solid footing on three separate pillars. The three critical resort elements, as illustrated in Plate I.1, are: physical, market and economic characteristics.

CRITICAL RESORT ELEMENTS

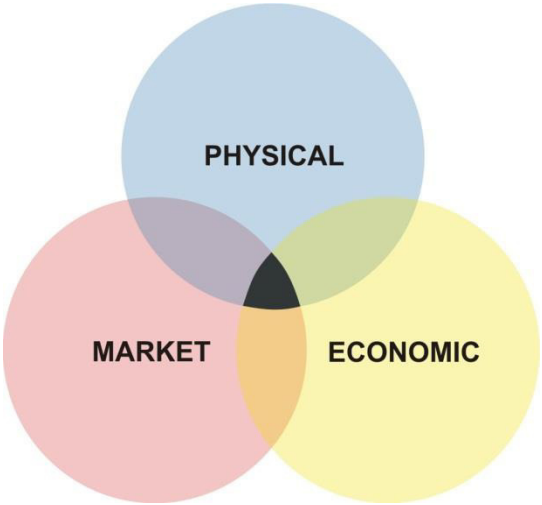


PLATE I.1

The physical site characteristics include:

- environmental resources including water, air, soil, vegetation, wildlife
- terrain
- climate
- natural hazards
- visual resources
- recreational resources

The master planning process incorporates research by scientists, ecologists and recreational planners to document the physical characteristics of each individual site with air photos, topographical maps, three-dimensional computer models, on-site surveying and field works, as well as analytical planning technologies.

The next critical element necessary for a feasible mountain resort deals with the market characteristics including:

- access to the site
- size and proximity of primary and secondary markets
- population demographics such as: age, income and education
- population dynamics such as: growth, aging, and social trends, for example, fitness

Finally, there are economic factors and characteristics to be considered such as

- resort capacity
- length of operating season (winter and summer)
- infrastructure cost and availability
- capital costs of facilities
- operating efficiency
- revenue sources and pricing
- human resources

Every resort possesses a different blend of these characteristics. It is very important to understand and document the balance between the physical, market and economic characteristics of each individual project.

.3 Goals & Objectives

The Inventory and Technical Assessment involve an analysis which assesses the physical characteristics of the mountain and base land terrain. The objective is to determine the size, capacity and general skill level balance of potential ski terrain within the study area. Additionally, the study delineates zones which are capable of supporting various types of base area development, such as parking, recreational activities and overnight accommodation. It is very important to understand the potential mountain and base land capacities of a site before the master planning process is started. The goals are summarized as follows:

- Create a high quality, “Four-Season Recreational Tourist Area”, offering a wide variety of unparalleled recreational activities in a natural environment.

- Evaluate opportunities to provide a diverse and well-rounded set of recreational and commercial amenities to attract a broad range of clientele, including the local and regional population, as well as international visitors for year round enjoyment.

- Provide a sanctuary for people from the large local and regional cities, where they can enjoy the natural surroundings and experience the climate and beauty of the mountain environment.

- Balance the supply of parking and guest facilities with the natural carrying capacity of the recreational amenities, considering the anticipated number of day visitors to the resort.

- Create a resort development model which contributes to the local economy and provides local and regional employment opportunities.

- Optimize the use and operational efficiency of the proposed infrastructure and area layout. Balance mountain capacity with guest services and parking.

- Provide base staging areas in balance with mountain access requirements.

- The development will respect and complement the natural, cultural and ecological value of the site.

- Provide a balance of skiable terrain which caters to the skier skill levels within the apparent local, regional and destination markets.

- Develop a dedicated children's beginner area with terrain suitable for teaching, snow play and snow tubing park that is suitable for all family members.

.4 Glossary

The ski industry has a number of terms specific to ski area development, hence, a glossary is provided to the reader. When the term "skier" is used it can generally be assumed to refer to both skiers and snowboarders.

1. **Skier Visit -** One person visiting a ski area for all or part of a day or night for the purpose of skiing. Skier visits relate to persons holding a full-day, half-day, night, complimentary, adult, child, season, or any other ticket type that gives them the right to the use of an area's facilities.

2. **Rated Uphill Capacity -** The manufacturer's rated number of skiers per hour a lift can transport to the top of the lift. An area's hourly capacity is the sum of the capacities of the individual lifts.
3. **VTM/Hour (000) - (Vertical Transport Meters Per Hour) -** The number of people lifted 1.000 vertical meters in one hour (vertical rise of a lift, times the lift capacity per hour, divided by 1.000). An area's total VTM, is the sum of VTM for all lifts.

4. **VTM Demand/Skier/Day -** The average amount of vertical skied (demanded) each day by a skier. VTM demand increases with a skier's ability level.

5. **Skier (Comfortable) Carrying Capacity (SCC) -** The number of skiers that a given ski area can comfortably support on the slopes and lifts without overcrowding, or those that may be accommodated at any one given time and still preserve a congenial environment. A ski area's comfortable carrying capacity is a function of VTM demand per skier, VTM supplied per hour, difficulty of terrain and scope of support facilities.

6. **Utilization -** Measured as a percent of the available skier carrying capacity. Comfortable Seasonal Capacity is the product of a ski area's daily skier carrying capacity times the number of days per season that it is operating. Utilization compares the actual skier visits to a calculated theoretical comfortable seasonal capacity.

7. **Terrain Pod -** A contiguous area of land deemed suitable for ski lift and trail development due to its slope gradients, exposure and fall line characteristics.

8. **Terrain Capacity Analysis (TCA)** – The Terrain Capacity Analysis defines major terrain "pods" within the study area which have good potential for ski development, mainly to derive the total number of skiers at acceptable skier densities.

GALIČICA
NATIONAL PARK

Figure I.1

AREA LOCATION - OVERVIEW

GALIČICA
NATIONAL PARK

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Date: 02/2013

Scale 1:100.000 (for A3 printout)

0 1,25 2,5 5 km

LEGEND

- NATIONAL BORDER
- EXISTING PAVED ROAD
- EXISTING MOUNTAIN ROAD
- NATIONAL PARK BOUNDARY

OHRID
Rača
Šipokno
Sv. Stefan
D. Konjsko
LAKE OHRID
Lagadin
Elešec
Peštani
Gradište
Trpejca
Ljubaništa
RESEN
LAKE PRESPA
Oteshevo
Stenje
REPUBLIC OF MACEDONIA
ALBANIA

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Figure I.2

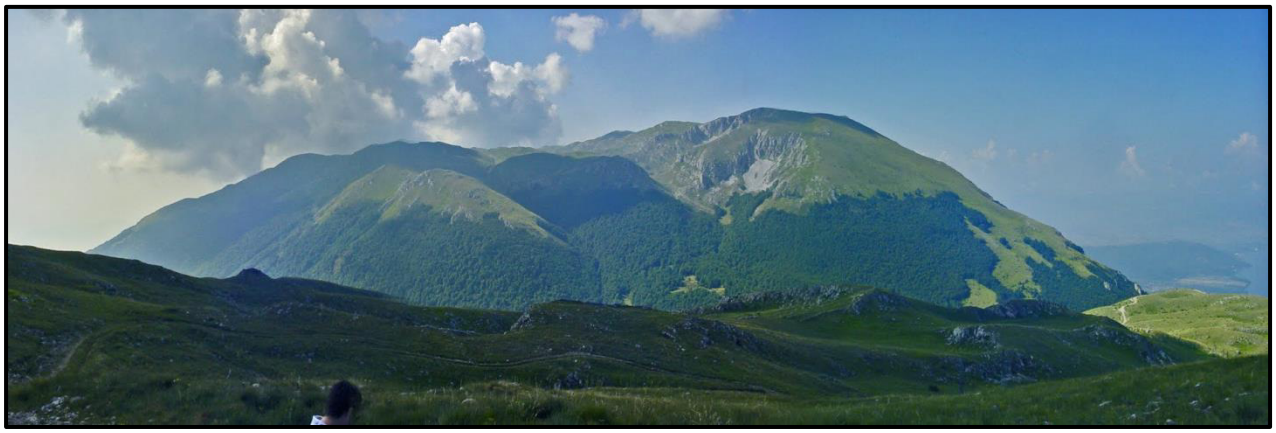
REGIONAL CONTEXT

II. INVENTORY

.1 Overview

The inventory stage includes the identification, analysis and mapping of all on-site and off-site factors which may affect the development potential of the ski area. The inventory data includes: the land status, climatic, biophysical, and physiographic characteristics of the study area, as well as an analysis of the existing terrain of the study area. Through an understanding of the site's existing conditions and processes, environmentally sensitive areas can largely be avoided and natural development opportunities maximized.

As a prelude to discussing the mountain's characteristics, it is appropriate to familiarize the reader with the basic requirements of ski area development. Ski area development is generally considered to be a non-consumptive resource use of the land. The development of ski lifts and ski pistes requires the use of approximately 30-50 % of the area in small, heavily developed zones. Lift right-of-ways are generally 12 to 15 m in width, while pistes typically vary between 30 and 60 m wide. "Ski ways" are mountain roads that are 6-10 m wide with longitudinal slope gradients between 8-12%. Subsequent to rough grading practices for each site, pistes require fine grooming and seeding to establish a grass cover. This grass cover prevents erosion and helps to minimize hazards and damage to skiers' and snowboarders' equipment and to the area's snow grooming fleet during low snowpack periods. Ski lifts are generally aerial cable systems with steel towers and concrete foundations every 45 to 75 m.



Mt. Magaro (2.255m), highest Peak within *Galičica* National Park

A ski resort's base area development generally includes paved access roads, parking lots, accommodation, a service and commercial center, event space and a wide variety of four season recreation facilities. Additionally, appropriate power and water supply, and sewage and waste disposal facilities are required to support the base area development.

The physical site characteristics discussed in this section all interact to aid the planning team when assessing the capability of the natural systems to support resort development. The purpose of the Technical Assessment section is to blend the information and/or constraints that are identified with acceptable ski industry design parameters.

Topographic Map Set-Up

The first step in the Technical Assessment of the Galičica study area is to prepare mapping suitable for computer analysis. Ecosign utilized a Digital Elevation Model (DEM) of the entire study area supplied by the client to generate the mapping with 5m contour interval. One small area of mapping in the southeastern corner was digitized with 10m intervals from a map image. The official mountain study area of the National Park contains a total area of 24.151,4 hectares.

View towards the National Park from Lake Ohrid

.2 Physiography

The quality and feasibility of a winter sports site is highly dependent upon the topographic characteristics of each individual site. Physiographic features which substantially affect ski development in particular include: aspect (exposure), slope gradients, fall line patterns and elevation ranges.

Aspect

"Aspect" is defined as the horizontal direction in which a slope faces and is categorized using the 8 cardinal points of a compass (north, northwest, west, southwest, south, southeast, east and northeast). The slope gradient and aspect of terrain in combination greatly affect the amount and intensity of solar radiation received during the winter & spring ski season. The aspect of the terrain within the Galičica study area has been analyzed and is illustrated in Figure II.1 with colours representing the eight primary slope orientations. Cooler colours such as dark blue, light blue and green represent north-facing aspects which receive the least solar radiation during the winter months in the northern hemisphere. South-facing slopes are exposed to the greatest amount of solar radiation and are illustrated with warmer red, orange and yellow.

The slopes accessible from the existing deactivated chairlift (Lift 1/2CLF) are east-facing whereas the former slopes of Lift 2/T-Bar have a west-facing aspect. The mountain range of the Galičica National Park is oriented North - South and therefore the terrain is predominantly characterized by west and east facing slopes. The largest area with cold, north-facing slopes is in the south side of the study area on the north side of Mt. Magaro.

Elevation

The potential vertical drop available for lift serviced skiing also plays an important role in site suitability, since it determines the length of the pistes and also the vertical transport meters (VTM) that can be supplied to the skiing and snowboarding public. Essentially, the more vertical the better, as many skiers use vertical rise as a basic yardstick of ski area desirability.

The total maximum elevation range within the Galičica National Park is approx. 1.564 vertical meters from the top of peak Magaro (el. 2.254 m) being the highest point to Lake Ohrid (el. 690 m) and 1.412 vertical meters to Lake Prespa (el. 842 m). Although this seems to be a remarkable vertical range, based on Ecosign's experience and available climatic information supplied by the client, we feel that in general the terrain situated below 1.500m is not suitable for the development of commercial skiing. The elevation ranges within the study area are important for snow retention and length of the ski season as generally, higher elevations have lower temperatures and therefore, a longer operating season potential. The potential skiing zones have been identified to be south and north of the pass road R-504 between Lakes Ohrid and

Prespa and offer a maximum potential vertical of approx. 700 respectively 480 m. Figure II.2 graphically illustrates the elevation ranges within the Galičica National Park.

Mountain Slope Analysis

Slope gradients are a critical factor in evaluating potential ski area development. Ecosign analyzed the mapping provided by the client to create Figure II.3, the Mountain Slope Analysis. In this plan, ranges of slope gradients are represented by different colours to illustrate slopes suitable for different types of skiing. Table II.1 outlines the five ranges in slope gradients represented in the Mountain Slope Analysis, their corresponding colour and suitability for skiing. Areas represented in white on the slope map are too flat for skiing; red areas are too steep. In terms of slope gradients, ideal ski terrain is represented on the Mountain Slope Analysis by a mix of green and yellow with some blue.

TABLE II.1
SLOPE GRADIENTS AND COLOUR CODES OF THE MOUNTAIN SLOPE ANALYSIS

SLOPE GRADIENT	COLOR	TYPE OF SKIING/ SNOWBOARDING
0% to 8%	White	Flat Terrain, Marginal Skiing
8% to 25%	Green	Beginner & Novice Skiing
25% to 45%	Yellow	Intermediate Skiing
45% to 70%	Blue	Advanced and Expert Skiing
70% +	Red	Unskiable, Hazard Area

The Mountain Slope Analysis clearly illustrates that the terrain within the Galičica National Park Study area offers a wide variety and great mix of terrain gradients.

Base Slope Analysis

Ecosign conducted a second analysis of the slope gradients within the Galičica study area to determine appropriate sites for base area development. The Base Slope Analysis is presented in Figure II.4 and illustrates ranges in slope gradients with colours that represent terrain that is suitable for different types of base area development. The same five colours are used as in the Mountain Slope Analysis, however the ranges in slope gradients are finer, as shown in Table II.2. Table II.2 provides a summary of the development suitability of the five colours illustrated in the Base Slope Analysis.

TABLE II.2
BASE AREA SLOPE ANALYSIS

SLOPE GRADIENT	COLOUR	DEVELOPMENT SUITABILITY
0 to 8%	White	Suitable for roads, parking, high density village style developments, snow play zones with limited terrain modification
8 to 15%	Green	Smaller multi-family townhouse (medium density) developments, roads with some terrain modification, snow play and beginner zones roads and parking with some terrain modification
15 to 25%	Yellow	Single-family chalet (low density) developments with substantial grading to provide access.
25 to 40%	Blue	Marginal for low density, single-family development with substantial grading required to provide access
40%+	Red	Too steep for development

High density, compact resort development such as hotels and parking lots should only occur on land with slopes of less than 15% and ideally on slopes of less than 8% to minimize cut and fill and allow for a development that is easily integrated into the surrounding landscape. Medium and low density development can occur in areas represented in yellow and blue if connections to existing or proposed infrastructure can efficiently be made. Slopes over 40% represented in red are too steep for economically viable and environmentally sensitive base area development, as extreme earthworks are required in order to provide road access and suitable building sites.

The Base Slope Analysis for Galičica reveals that the most significant areas with slopes suitable for development (represented by white and green) are located predominantly in the central part of the Park on the upper plateau between the two mountain ranges and also along Lake Ohrid in smaller disconnected areas. As the development objective for the Galičica Ski Area does not include significant base area development, only a small area will be required for base area development. The Base Slope Analysis will be utilized in the next step in the planning process as a basis for analyzing and assessing potential base area sites.

.3 National Park Zoning

Galičica National Park was established in 1958 and includes 24.145 hectares of mountainous terrain between Lake Ohrid to the west and Lake Prespa to the east. The Park extends over 25km with the border of Albania to the south and the historic City of Ohrid to the north. There are four established management zones within Galičica Park:

1. Zone of Strict Protection
2. Zone of Sustainable Use
3. Zone of Active Management
4. Buffer Zone

Ecosign has prepared a map illustrating the zoning plan that has been established for the National Park (Figure II.5). The majority of the Park is a mix of Sustainable Use Zone and Active Management Zone. The Mt. Magaro Zone in the southern part of the study area is the largest area of Strict Protection Zone and is surrounded by a Buffer Zone. There is a second smaller area of Strict Protection and Buffer Zone on the southeastern corner of the Park. Table II.3 below outlines the activities that are permitted within each of the 4 Galičica National Park Zones. It should be noted that skiing is a permitted activity in all zones except for the Strict Protection Zone.

TABLE II.3
GALICICA NATIONAL PARK ZONING

Дозволени и забранети активности во зоните / Permitted and forbidden activities in the zones				
Активности/ Activities	**Зони / Zones**			
	строга заштита / *strict protection*	активно управување / *active management*	одржливо користење / sustainable use	заштитен појас / *Buffer zone*
Научни истражувања, вклучително и археолошки (само со претходна дозвола) / *Scientific research, including archeological excavations (with previously obtained permit only)*	ДА/YES	ДА/YES	ДА/YES	ДА/YES
Пешачење (по обележани патеки) / *Hiking (along marked trails)*	ДА/YES	ДА/YES	ДА/YES	ДА/YES
Пешачење (надвор од обележани патеки) / *Hiking (outside the marked trails)*	НЕ/NO	НЕ/NO	ДА/YES	ДА/YES
Скијачко трчање / *Ski Running*	НЕ/NO	ДА/YES	ДА/YES	ДА/YES
Кампување во дивина на одредени локации / *Wilderness camping at designated locations*	НЕ/NO	ДА/YES	ДА/YES	НЕ/NO
Палење оган на отворено / *Outdoor fire*	НЕ/NO	НЕ/NO	НЕ/NO	НЕ/NO
Собирање габи, плодови и растенија (пр. чај, смреклинки, печурки и др.) / *Collecting fungi, fruits and plants (ex. tea, juniper berries, mushrooms etc.)*	НЕ/NO	НЕ/NO	ДА/YES	НЕ/NO
Собирање животни (пр. пеперутки, желки, и др.) / *Collecting animals (ex. butterflies, turtles etc.)*	НЕ/NO	НЕ/NO	НЕ/NO	НЕ/NO
Собирање дрва и гранки / *Collecting trees and branches*	НЕ/NO	НЕ/NO	ДА/YES	НЕ/NO
Риболов / *Fishing*	НЕ/NO	НЕ/NO	НЕ/NO	НЕ/NO
Лов / *Hunting*	НЕ/NO	НЕ/NO	НЕ/NO	НЕ/NO
Алпско скијање (на неуредени места) / *Alpine Skiing (on unfurnished sites)*	НЕ/NO	ДА/YES	ДА/YES	ДА/YES
Искачување на карпи на уредени места / *Rock climbing at designated location*	НЕ/NO	ДА/YES	ДА/YES	НЕ/NO
Планински велосипедизам по уредени патеки / *Mountain biking on purpose-built trails*	НЕ/NO	ДА/YES	ДА/YES	ДА/YES
Автомобили и мотоцикли по постојни асфалтни и земјени патишта / *Automobiles and motorcycles along existing asphalt and dirt roads*	НЕ/NO	ДА/YES	ДА/YES	ДА/YES
Јавање / *Horseback riding*	НЕ/NO	ДА/YES	ДА/YES	ДА/YES

Source: *Galičica* National Park Tourist Map

Galičica National Park is within the Ohrid Zone UNESCO World Heritage Site, the multi-national Park Prespa which is managed by Albania, Greece and Macedonia, as well as within the Municipality of Ohrid. These three political boundaries are illustrated on Figure II.5.

The World Heritage of Ohrid Region has been inscribed in the World Heritage List with reference to the following criteria:

(i) represent a masterpiece of human creative genius;

(iii) bear a unique or at least exceptional testimony to a cultural tradition or to a civilization which is living or which has disappeared;

(iv) be an outstanding example of a type of building, architectural or technological ensemble or landscape which illustrates (a) significant stage(s) in human history and

(vii) contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance.

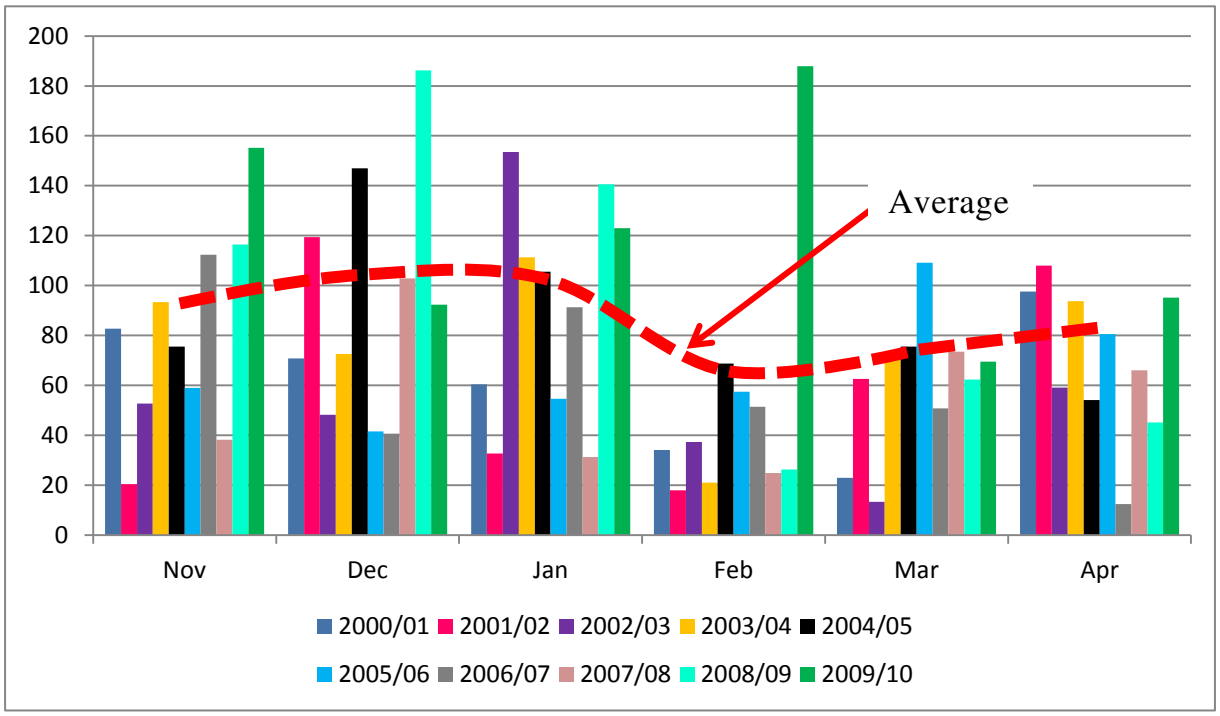
.4 Climate/Solar Analysis

Climate is an important factor in the ski resort planning process. Ecosign has analyzed the weather data supplied by the client for the years spanning from 2001 to 2010. The data was measured at the meteorological station of Ohrid and the meteo station located in Resen. We would like to point out that no measurements have been done for the massif Galičica, so a precise description of the climate is not possible. However, there are methods to interpolate weather data from areas in the proximity to get an idea of the weather situation in the mountainous areas of the Galičica National Park.

For the future, Ecosign strongly recommends the installation of weather stations up higher on the mountain in order to collect further valuable data regarding snow coverage, prevailing wind directions, wind speed and frequency and dimension of wind gusts.

These following graphs illustrate the most interesting findings regarding the climate. Plate II.1 illustrates the monthly average precipitation in Ohrid.

MONTHLY AVERAGE PRECIPITATION IN OHRID (mm /760 m.a.s.l.)

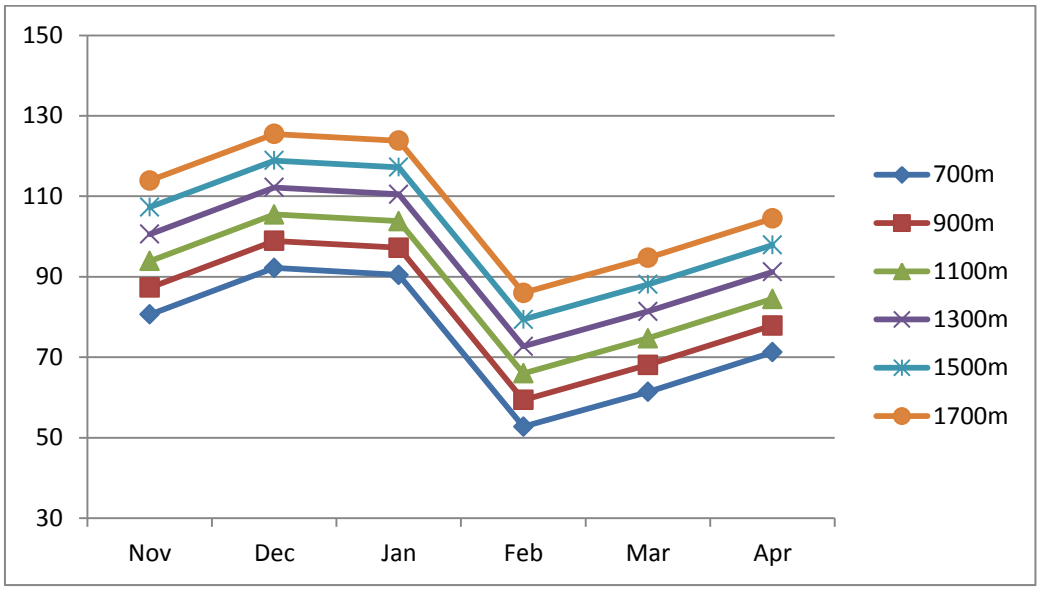


Source: Galičica National Park

PLATE II.1

Increase in elevation goes along with an increase in precipitation as illustrated on Plate II.2. Therefore the alpine areas typically experiences more precipitation and thus also a thicker snowpack than the areas located in the valley.

MEAN MONTHLY PRECIPITATION TRANSPOSED BY ALTITUDE (mm)

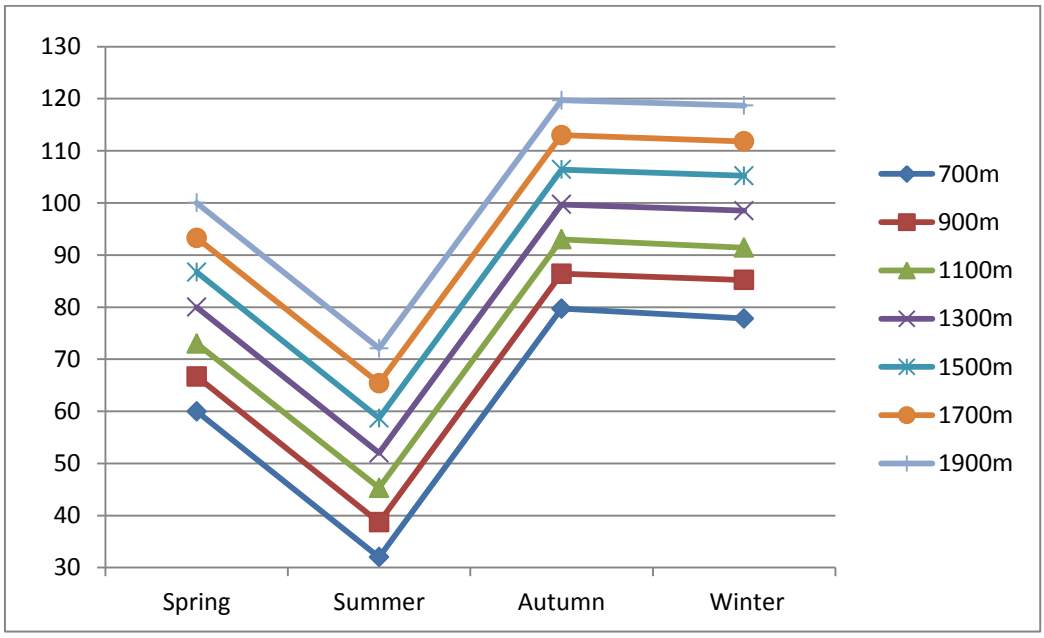


Source: Galičica National Park

PLATE II.2

As shown in Plate II.3, precipitations typically peaks in fall and winter. It is the lowest during the summer months.

MEAN MONTHLY PRECIPITATION BY SEASON TRANSPOSED BY ALTITUDE (mm)

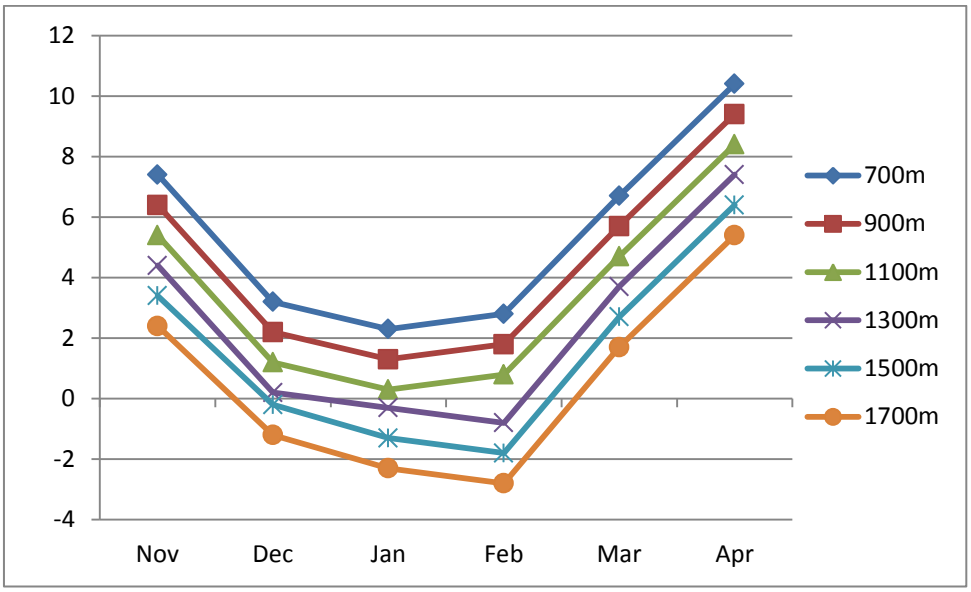


Source: Galičica National Park

PLATE II.3

Interpolated temperature data has been received from the Galicica National Park authorities for the different altitude zones of the National Park. Plate II.4 shows the average monthly temperatures transposed by altitude. Typically increase in elevation goes along with a drop in temperature. This correlation between temperature and altitude is also present in this area.

INTERPOLATED MEAN MONTHLY TEMPERATURE TRANSPOSED BY ALTITUDE (°C)



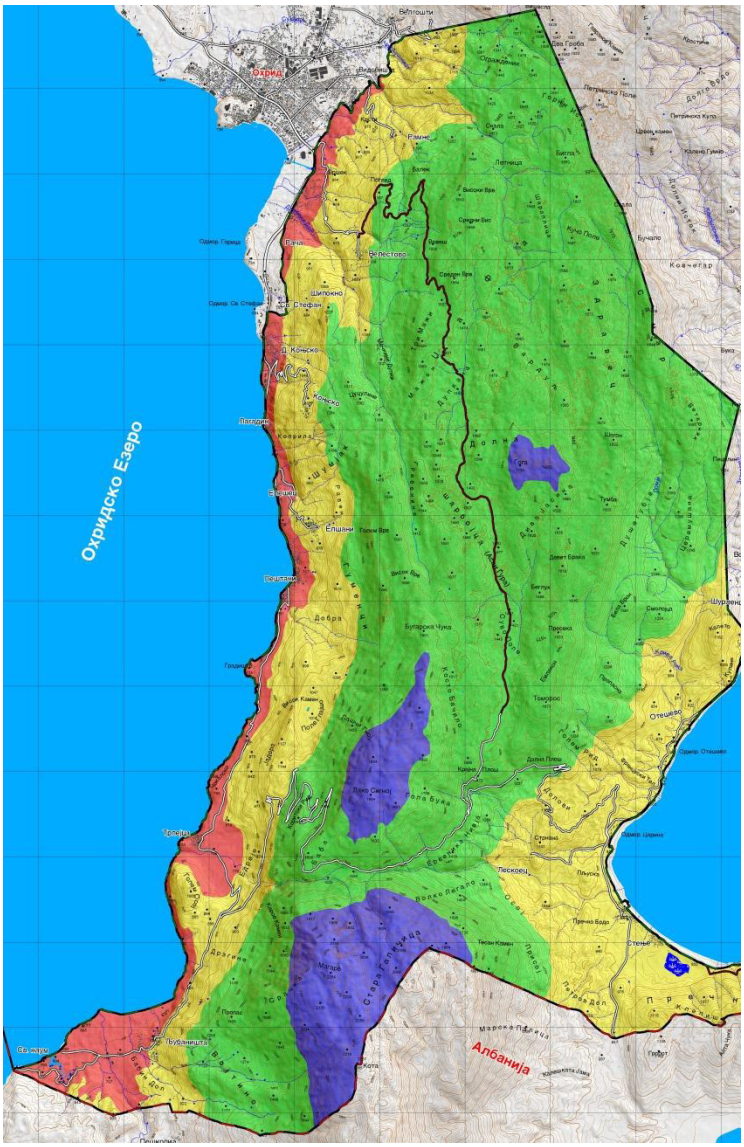
Source: Galičica National Park

PLATE II.4

The following four climatic zones are prevalent within the National Park:

- The warm continental climate zone of the Ohrid basin
- The temperate continental climate zone of the Prespa basin peculiar for Galičica at altitudes up to 1.100m
- The cold continental climate zone at altitudes between 1.100 and 1.700m
- The high-mountainous climate zone at altitudes between 1.700 and 2.200m.

The occurrence of the above mentioned climate zones is presented on the map below:



LEGEND	
	Warm continental climate zone
	Temperate continental climate zone
	Cold continental climate zone
	High-mountainous climate zone

Cold Continental Climate Zone (1.100 – 1.700 metres above sea level)

The cold continental climate zone covers parts of Galičica at altitudes between 1.100 and 1.700m. Due to lack of data acquired during the measurement of climate elements in this zone, an interpolation of the basic climate elements (air temperature and precipitation) was performed (according to A. Lazarevski, 1993), using the data collected from the meteorological stations Ohrid (760 m.a.s.l.) and Resen (881 m.a.s.l.). After performing the interpolation, the value of the temperature gradient for the summer period is 0,72°, for the spring and autumn period 0,5°, whereas during the winter it is 0,39°. The value of the hydric (precipitation) gradient is 65 mm at each increment of 100 m.a.s.l.

According to the state thermic and hydric gradients, the following values of average monthly and annual air temperature, as well as average monthly and annual total of precipitation for the cold continental climate zone were acquired and are presented in Table II.4 below.

TABLE II.4

	Month												annual
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	average
Temperature °C	-1,2	-0,1	2,3	6,6	11,2	13,6	15,9	15,3	13,2	8,2	3,6	0,4	7,4
mm precipitation	108	105	91	80	97	55	38	45	64	114	148	122	1.067

AVERAGE MONTHLY TEMPERATURE AND PRECIPITATION IN THE COLD CONTINENTAL CLIMATE ZONE

The distribution of average temperature and precipitation by seasons, as well as during the vegetation period (01.IV and 30.IX), is presented in Table II.5.

TABLE II.5
DISTRIBUTION OF AVERAGE TEMPERATURE AND PRECIPITATION FOR THE COLD CONTINENTAL CLIMATE ZONE BY SEASONS

	season			
	winter	spring	summer	autumn
Temperature °C	-0,9	6,7	14,9	8,3
mm precipitation	335	268	138	326

Considering the data in the in the table it may be asserted that the distribution of precipitation is irregular, the winter season with 335 mm and autumn season with 326 mm experience most precipitation, whereas the summer season with 138 mm precipitation is the dries seasons as expected.

High Mountainous Zone (1.700 – 2.200 m.a.s.l.)

This climate zone complements the previous cold continental climate zone and is covering the zone between 1.700 and 2.200 m.a.s.l. The influence of the high mountainous climate zone is mostly felt in the zone of the high mountainous grass areas of Old Galičica, but also on the remaining high peaks of Galičica. The predominantly rare low-grass and lodged semi-bushes and bushes of the vegetation existent in this area unambiguously confirms the presence of a harsh climate zone.

An interpolation was performed for this climate zone in similar manner as for the previous one (according to A. Lazarevski, 1993). According to the state thermic and hydric gradients, the following average monthly and annual air temperature, as well as the average monthly and annual total of precipitation for this climate zone were acquired and are presented in Table II.6 below.

TABLE II.6
AVERAGE MONTHLY TEMPERATURE AND PRECIPITATION FOR THE HIGH MOUNTAINOUS CLIMATE ZONE

	Month												annual
Temperature °C	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	average
	-3,2	-2,1	-0,3	4,1	8,8	10,0	12,2	11,8	10,6	5,6	1,2	-1,5	4,7
Precipitation mm	142	137	120	98	126	73	51	59	84	149	193	160	1.392

The distribution of average temperature and precipitation by seasons is presented in Table II.7.

TABLE II.7
DISTRIBUTION OF AVERAGE TEMPERATURE AND PRECIPITATION FOR THE HIGH MOUNTAINOUS CLIMATE ZONE BY SEASON

	season			
	winter	spring	summer	autumn
Temperature °C	-2,3	4,2	11,3	5,8
mm precipitation	439	344	183	426

Precipitation values clearly indicate that winter (439mm) and autumn (426mm) are the periods of the year with most precipitation. In addition to the weather data from Ohrid, we also received precipitation and snow cover data from the weather stations in Stenje and Saint Naum. These stations are relatively close to the study area as illustrated in the map below.

Rainfall station STENJE

Period: 2006-2010

Table 13: Monthly total of precipitation in mm, number of days under snow cover and maximal height of snow cover in cm

Year	Month	q l	l N	l Hmax	data
2006	01	85.7	18	7	6
	02	84.7	17	15	6
	03	113.6	4	6	3
	04	94.7	0	0	0
	11	60.6	1	1	11
	12	35.2	1	1	22
2007	01	73.4	1	1	28
	02	57.5	0	0	0
	03	61.6	0	0	0
	04	55.3	0	0	0
	11	27.0	0	0	0
	12	24.8	4	7	18
2008	01	45.2	6	2	1
	02	21.4	3	1	18
	03	62.6	2	5	26
	04	75.0	0	0	0
	11	76.9	3	5	24
	12	138.5	6	10	28
2009	01	155.8	21	25	5
	02	27.2	3	2	19
	03	113.4	9	57	21
	04	79.1	0	0	0
	11	119.6	0	0	0
	12	185.7	7	12	20
2010	01	122.3	12	30	28
	02	312.4	19	35	15
	03	113.3	10	20	9
	04	82.0	0	0	0
	11	121.8	0	0	0
	12	129.0	7	27	16

Rainfall station SAINT NAUM

Period: 2006-2010

Table 14: Monthly total of precipitation in mm, number of days under snow cover and maximal height of snow cover in cm

Year	Month	q l	l N	l Hmax	data
2006	01	57.2	9	20	19
	02	37.9	2	10	10
	03	74.4	1	1	15
	04	57.1	0	0	0
	11	34.7	1	2	13
	12	10.7	0	0	0
2007	01	47.7	0	0	0
	02	42.3	0	0	0
	03	53.0	0	0	0
	04	13.3	0	0	0
	11	116.1	0	0	0
	12	33.3	5	4	19
2008	01	5.5	1	4	2
	02	33.8	0	0	0
	03	68.8	1	5	25
	04	62.1	0	0	0
	11	29.9	1	1	24
	12	74.0	1	2	27
2009	01	131.2	16	27	5
	02	13.1	1	5	13
	03	54.1	5	42	22
	04	28.1	0	0	0
	11	92.7	0	0	0
	12	80.0	2	3	12
2010	01	95.4	5	30	29
	02	156.4	2	25	15
	03	76.6	4	25	9
	04	73.2	0	0	0
	11	85.7	0	0	0
	12	90.6	6	20	15

Ecosign did not receive all the necessary requested data on temperature, depth of snow pack or any wind data which is usually taken into consideration when making statements on the suitability of certain areas for ski area development. We have done our best utilizing the information that was available and supplied by the client during the time of the study.

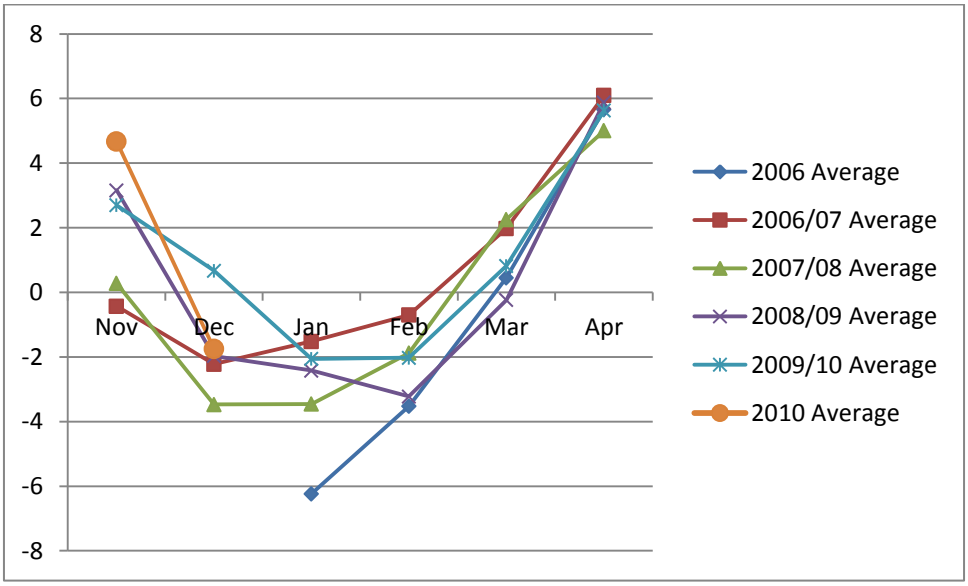
We expect high winds to be present in these mountains due to the special location of the site, between the two major lakes. This assumption was confirmed during the winter site visit and from studying the available winter photos of the study area.

Wind exposed area with narrow scarce coverage

There is an obvious pattern of wind induced snow movement at exposed areas such as ridges and peaks. Snow accumulates in wind-sheltered areas, whereas other areas are left bare. A large portion of this blowing snow can be collected by adequately snow fencing some areas and redistributing the accumulated snow with grooming machines afterwards.

In order to get more information on the weather situation within the study areas, Ecosign has gathered temperature data available from the Internet for the nearby Ohrid airport at 705 meters elevation over a period of the winter months for the last 3 years and interpolated from that to derive approximate temperatures at a tentative Galičica base area for an elevation of 1.550 meters, using an average barometric temperature coefficient of 0,65 degrees Kelvin pro 100 m. This allows to produce an estimated range for the average temperatures over the mentioned periods as shown in the Plates II.5 to II.10.

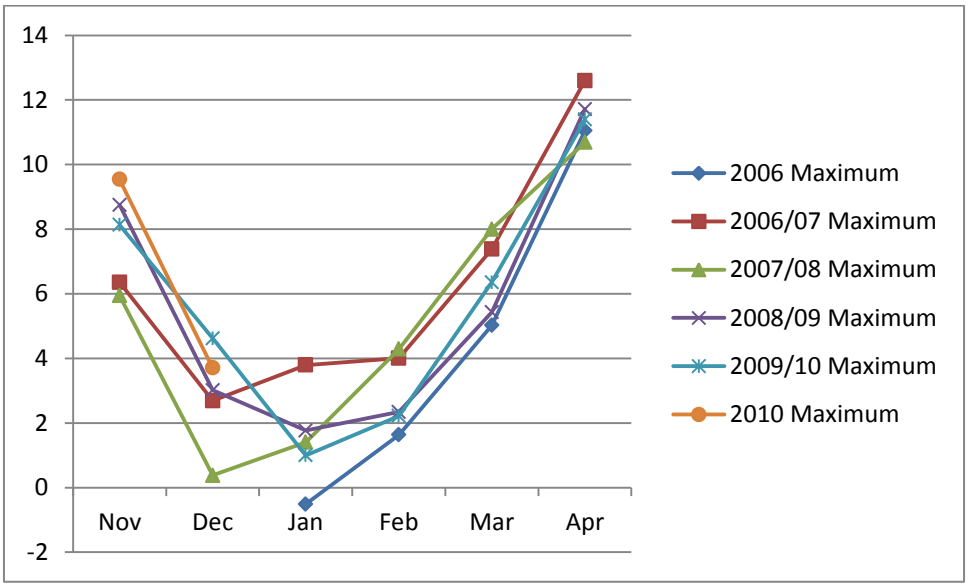
INTERPOLATED AVERAGE MONTHLY MEAN TEMPERATURES JAN. 2006 - DEC. 2010



Source: Interpolated data from MEPSO

PLATE II.5

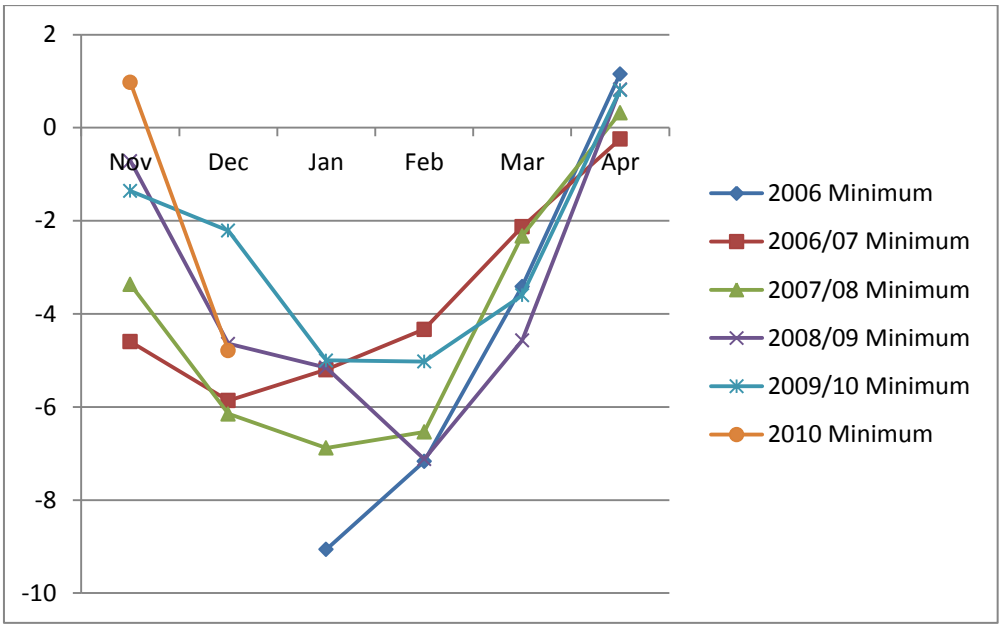
INTERPOLATED AVERAGE MONTHLY MAXIMUM TEMPERATURES JAN. 2006 - DEC. 2010



Source: Interpolated data from MEPSO

PLATE II.6

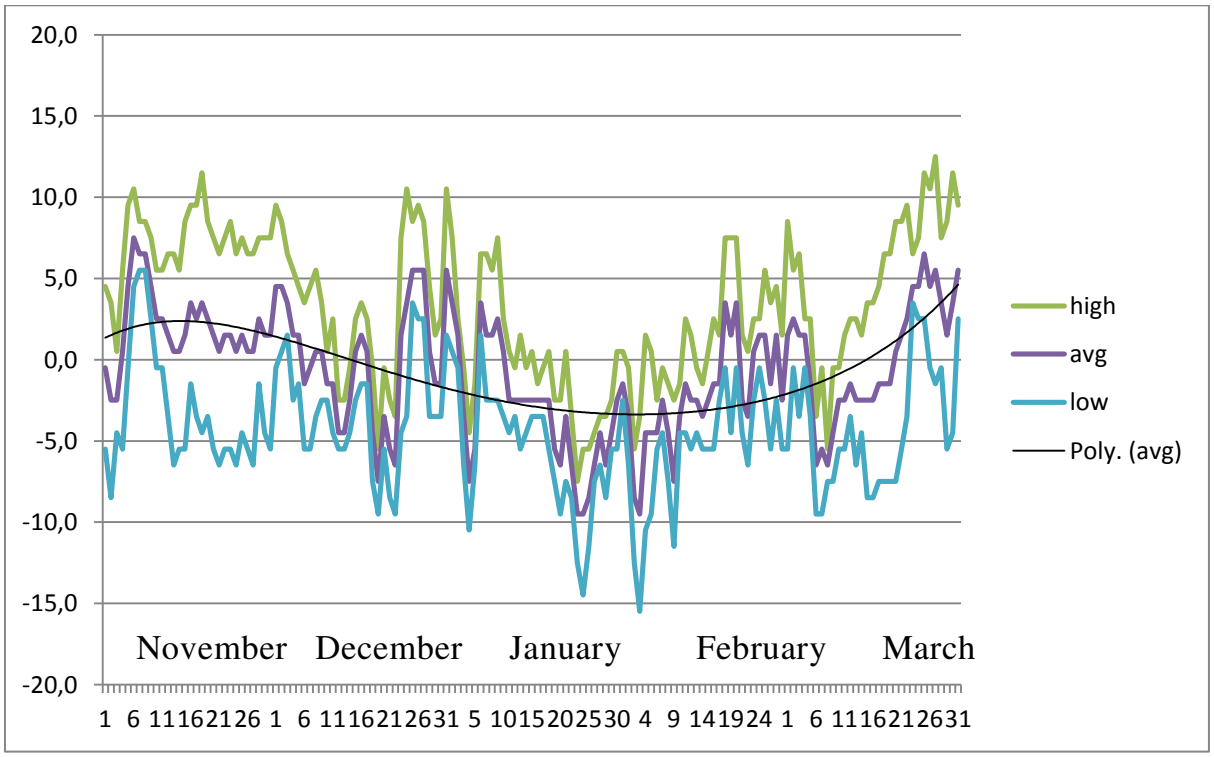
INTERPOLATED AVERAGE MONTHLY MINIMUM TEMPERATURES JAN. 2006 - DEC. 2010



Source: Interpolated data from MEPSO

PLATE II.7

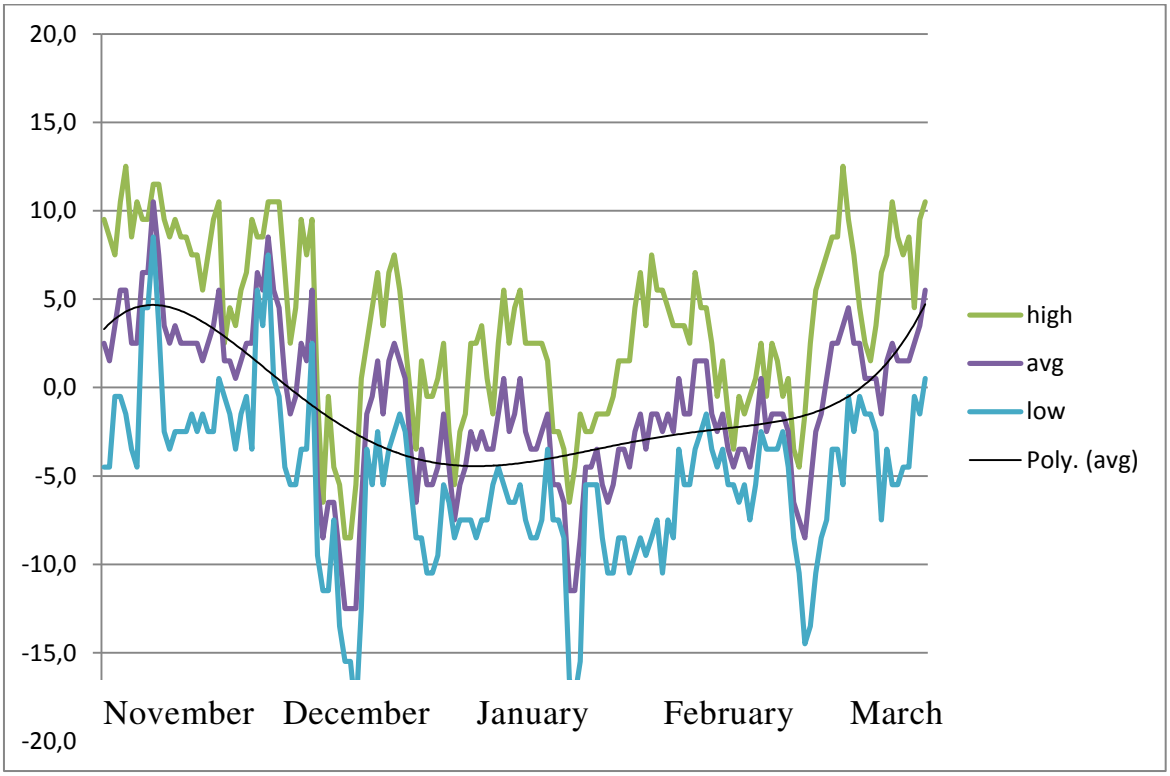
INTERPOLATED TEMPERATURES NOV. 2009 - MARCH 2010



Source: Interpolated data from www.wunderground.com

PLATE II.8

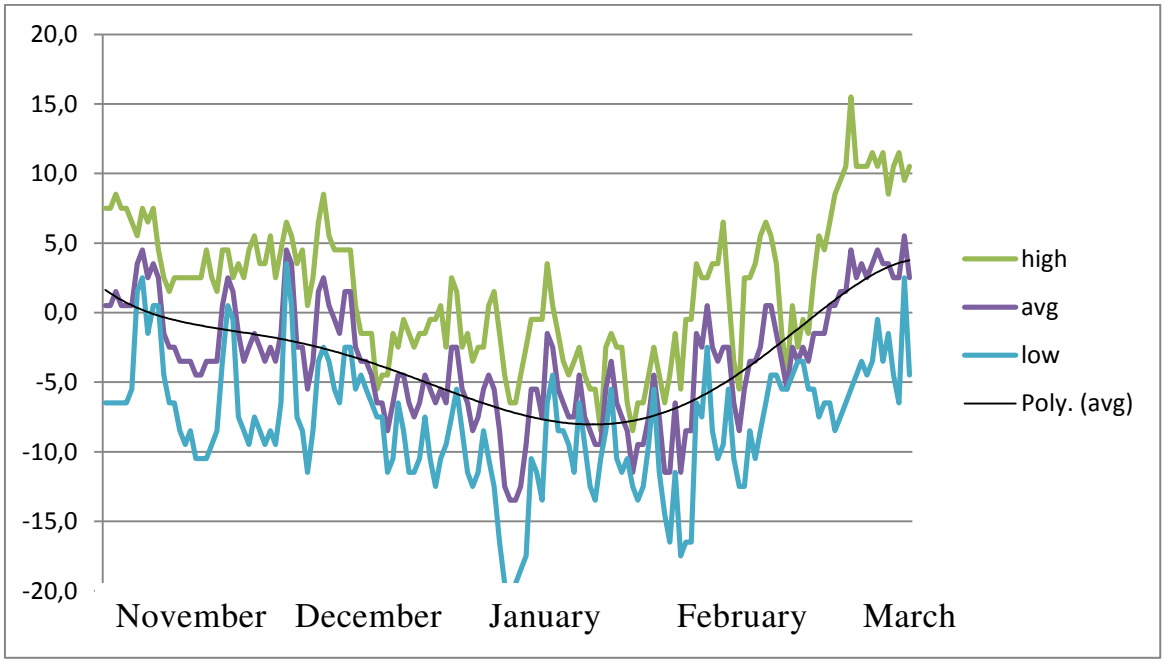
INTERPOLATED TEMPERATURES NOV. 2010 - MARCH 2011



Source: Interpolated data from www.wunderground.com

PLATE II.9

INTERPOLATED TEMPERATURES NOV. 2011 - MARCH 2012



Source: Interpolated data from www.wunderground.com

PLATE II.10

These temperature analyses show average negative mean temperatures throughout a duration of two and a half to three and a half months over the last few years, which confirms a relatively short season and the need for wind fencing and possibly a snowmaking system in order to protect the use of future investments.

However, overall the winter season seems to be long enough for winter tourism and for commercial skiing in Galičica. Precipitation is the highest in fall and winter, which in combination with low temperatures, should help to build a good snowpack for the ski season. But again, due to the relatively low latitude of the site, artificial snow-making would be recommended for specific slopes within the ski centre to help ensure a longer ski season and reliable snow coverage.

Solar Analysis

Most skiers and snowboarders are highly aware of the sun's influence on snow quality. While they prefer to ski in the sun, they will not do so if the snow is sticky or mushy due to intense solar radiation. As illustrated in Plate II.8, skiers will follow the sun throughout the day, skiing eastern exposures in the morning, southern exposures at noon and western exposures in the afternoon. Conversely, after a large snowfall, skiers will choose to ski on north facing slopes where the snow quality is the best as a result of the least amount of solar radiation.

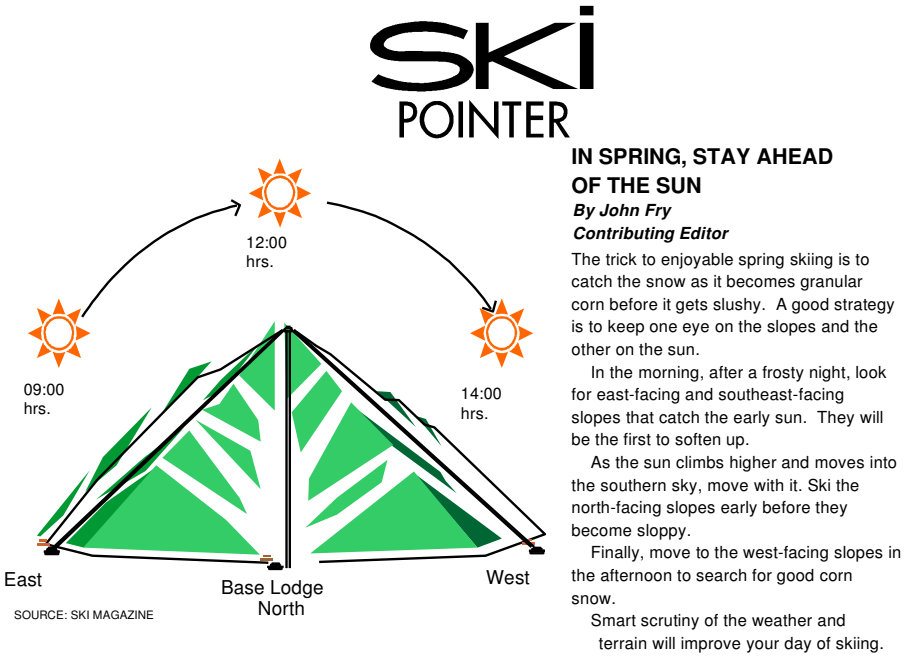


PLATE II.11

As a result of the sun's position in winter in the northern hemisphere, south-facing slopes are the warmest, eastern and western slopes the next warmest and northern slopes the coolest. Snowpack retention is a critical concern for any skiing operation and for this reason, slopes and pistes should naturally be located where the snowpack remains for the longest period of time. Parking and skier service facilities such as ticket offices and coffee shops should be placed in a sunny location in the morning as guests arrive at the resort. Outdoor restaurant seats and terraces should be oriented to the south and southwest to take advantage of the midday and afternoon sun, especially for the après ski. While this sunny aspect is ideal for the development of the base area, it is unfavorable for mountain development, as excessive exposure to sunlight will have a negative effect on the snow quality.

Shadows cast during the winter months on the Galičica study area have been analyzed at 9am, noon and 3pm and presented graphically in Figures II.6a, II.6b and II.6c respectively. As a result of the north-south orientation of the mountain range within Galičica National Park, morning shadows are predominantly on the western Lake Ohrid side of the Park, while afternoon shadows cover the eastern side on Lake Prespa. The only area covered in shade at noon is on the north side of Mt. Magaro. The Solar Analysis is used in the planning process to ensure that restaurant patios, beginner ski zones and other facilities are located in appropriately sunny areas.

Solar Radiation Analysis

The amount of solar radiation impacting the surface of land is a function of elevation, slope, aspect and solar shading from surrounding topographic features. As mentioned previously, topographic shading decreases the temperature near the ground which causes the snow to last longer, and the angle of which the sun strikes the ground also affects the rate of spring snow melt and quality.

Even small changes in aspect can result in substantial differences in surface warming. With this in mind, we have calculated the cumulative quantity of the potential incoming solar radiation on a monthly basis for the winter ski season from December 1 to March 31. Time of year, sun position (azimuth and altitude), shadows cast by surrounding terrain, terrain slope, and terrain aspect are all analyzed to simulate and calculate direct, diffuse, and reflected radiation[1].

The result is an accurate representation of potential energy income in kilowatt-hours per square meter. The calculation has been repeated every 15 min from sunrise to sunset for each day in a grid system over the entire study area. Figure II.7, the Solar Radiation Analysis, uses a warm and cool colour spectrum to

[1]SOLEI, I. Mészároš, P. Miklánek (2006): Calculation of potential evapotranspiration based on solar radiation income modeling in mountainous areas. Biologia, ISSN-1335-6372, Vol. 61, Suppl. 19, pp. S284-S288.

illustrate incoming solar radiation over the course of the four months of the ski season.

The Solar Radiation Plan Figures II.7 clearly show how the Galičica study area (located at ~41° Latitude) absorbs a significant amount of energy on southern aspects during the winter season, and much less on northerly facing slopes. Slopes that absorb greater than 500 kWh/m² of solar energy per winter season (yellow through red colors) will have a much more poor snow quality and lower snowpack, therefore ski pistes should be avoided in these areas unless they are at higher elevation. At higher areas snow retention will be superior due to the colder temperatures.

.5 Existing Mountain Facilities

Ski Lift and Piste Inventory

The existing ski lifts at the Galičica Ski Area are illustrated on Figure II.8, the Existing Mountain Facilities Plan. None of the two lifts have been in operation within the last two decades. Therefore the infrastructure is considerable old and cannot be used anymore. Ecosign recommends that both lifts be dismantled.

The existing infrastructure consists of one two-passenger fixed grip chairlift and one surface T-Bar lift, both of which are not operational. The technical specifications are listed in Table II.8. In the past, there used to be an additional beginner lift which is now currently out of service. The two existing deactivated lifts have a theoretical combined rated capacity of approximately 2.300 people per hour (pph) and generate approximately 204.000 VTM/hr.

TABLE II.8
GALIČICA SKI AREA
LIFT INVENTORY

Lift Number **Lift Type** **Constructed**	**Lift 1** **2CLF** **late 80s**	**Lift 2** **T-Bar** **late 80s**
Top Elevation [m]	1.885	1.670
Bottom Elevation [m]	1.545	1.485
Total Vertical [m]	340	185
Horizontal Distance [m]	970	600
Slope Distance [m]	1.028	628
Average Slope [%]	35%	31%

Bottom of Lift 1/ Two-Passenger Fixed Grip Chairlift

Lift 2/Surface T-Bar on Mt. Tomoros

Historically there were 2 main ski pistes on Lift 1 and we assume that Lift 2 also had a ski piste on each side of the lift track. In the past, when the ski area was still in operation there was also a beginner area with two rope-tows located between Lift 1 and Lift 2.

.6 Existing Base Facilities

Base area facilities within the mountainous region of Galičica National Park are limited to two mountain huts, two wilderness campgrounds and a picnic area/lookout. The majority of tourist facilities within the National Park Boundary are located along the eastern shore of Lake Ohrid and include several campsites, overnight tourist accommodation, museums, churches and picnic areas. South of the City of Ohrid's extensive tourist facilities, several hotels, apartments and villas can be found in lakeside villages between Peshtani and Rača. The Lake Prespa side of the Park is less developed than the Ohrid side with limited camping and overnight accommodation.

Summer activities within the mountainous region of the park include an extensive hiking trail network, 4x4 roads, wilderness campsites and picnic areas. Winter activities are limited as a result of weather dependent road access into the mountains and infrequent plowing of the road over the pass between the two lakes. The only base area facility that is operational in the winter is the Mountain House Sharbojca, located 4,5km north of the bottom of the Tomoros Lift. This 2-level building is approximately 200m² and sleeps 12 people in hostel style rooms on the second floor. The first floor has a kitchen and common seating area.

Mountain House Sharbojca

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N

Contours: 20 Meters

Date: 02/2013

Scale 1:80.000 (for A3 printout)

0 750 1.500 3.000 m

LEGEND

- EXISTING LIFT
- EXISTING PAVED ROAD
- EXISTING MOUNTAIN ROAD
- NATIONAL BORDER
- NATIONAL PARK BOUNDARY

ASPECT

- FLAT
- NORTH
- NORTH-EAST
- EAST
- SOUTH-EAST
- SOUTH
- SOUTH-WEST
- WEST
- NORTH-WEST

OHRID
Rača
Šipokno
Sv. Stefan
D. Konjsko
Lagadin
Elešec
LAKE OHRID
Peštani
Gradište
Trpejca
Ljubaništa
Lift-2 / T-Bar
2CLF
Oteshevo
LAKE PRESPA
Stenje
REPUBLIC OF MACEDONIA
ALBANIA

bing
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Figure II.1

ASPECT ANALYSIS

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N

Contours: 20 Meters

Date: 02/2013

Scale 1:80.000 (for A3 printout)

0 750 1.500 3.000 m

LEGEND

- EXISTING LIFT
- EXISTING PAVED ROAD
- EXISTING MOUNTAIN ROAD
- NATIONAL BORDER
- NATIONAL PARK BOUNDARY

ELEVATION [m]

- < 900
- 900 - 1.100
- 1.100 - 1.300
- 1.300 - 1.500
- 1.500 - 1.700
- 1.700 - 1.900
- 1.900 - 2.100
- > 2.100

OHRID
Rača
Šipokno
Sv. Stefan
D. Konjsko
Lagadin
Elešec
LAKE OHRID
(690m)
Peštani
Gradište
Lift 2 / T-Bar
2CLF
Oteshevo
LAKE PRESPA
(842m)
Trpejca
Stenje
Ljubaništa
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Figure II.2

ELEVATION ANALYSIS

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N

Contours: 20 Meters Date: 02/2013

Scale 1:80.000 (for A3 printout)

0 750 1.500 3.000 m

LEGEND

- EXISTING LIFT
- EXISTING PAVED ROAD
- EXISTING MOUNTAIN ROAD
- NATIONAL BORDER
- NATIONAL PARK BOUNDARY

SLOPE [%]

- < 8
- 8 - 25
- 25 - 45
- 45 - 70
- > 70

OHRID
Rača
Šipokno
Sv. Stefan
D. Konjsko
Lagadin
Elešec
LAKE OHRID
Peštani
Gradište
Lift-2 / T-Bar
2CLF
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Figure II.3

MOUNTAIN SLOPE ANALYSIS

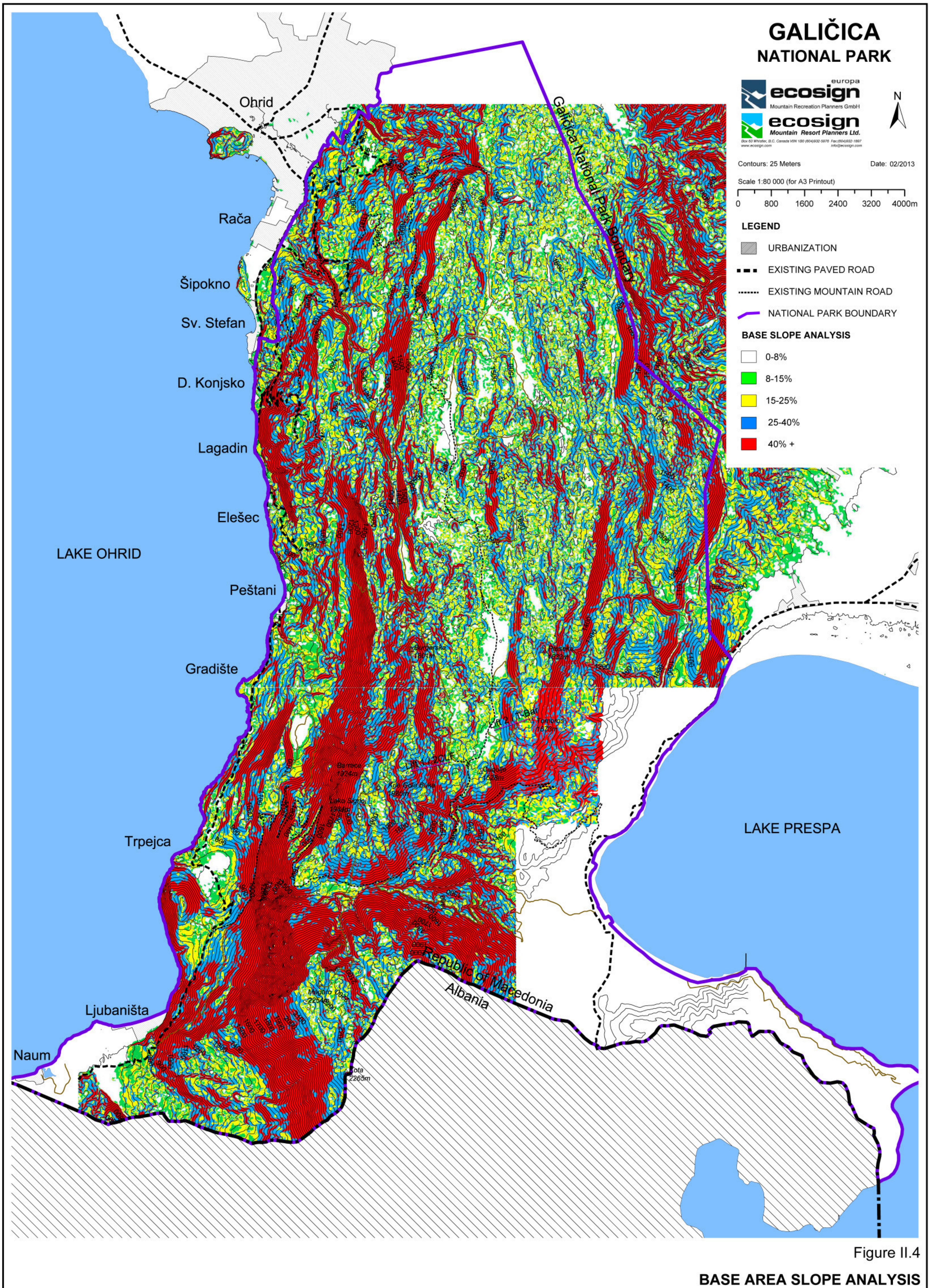

Figure II.4

BASE AREA SLOPE ANALYSIS

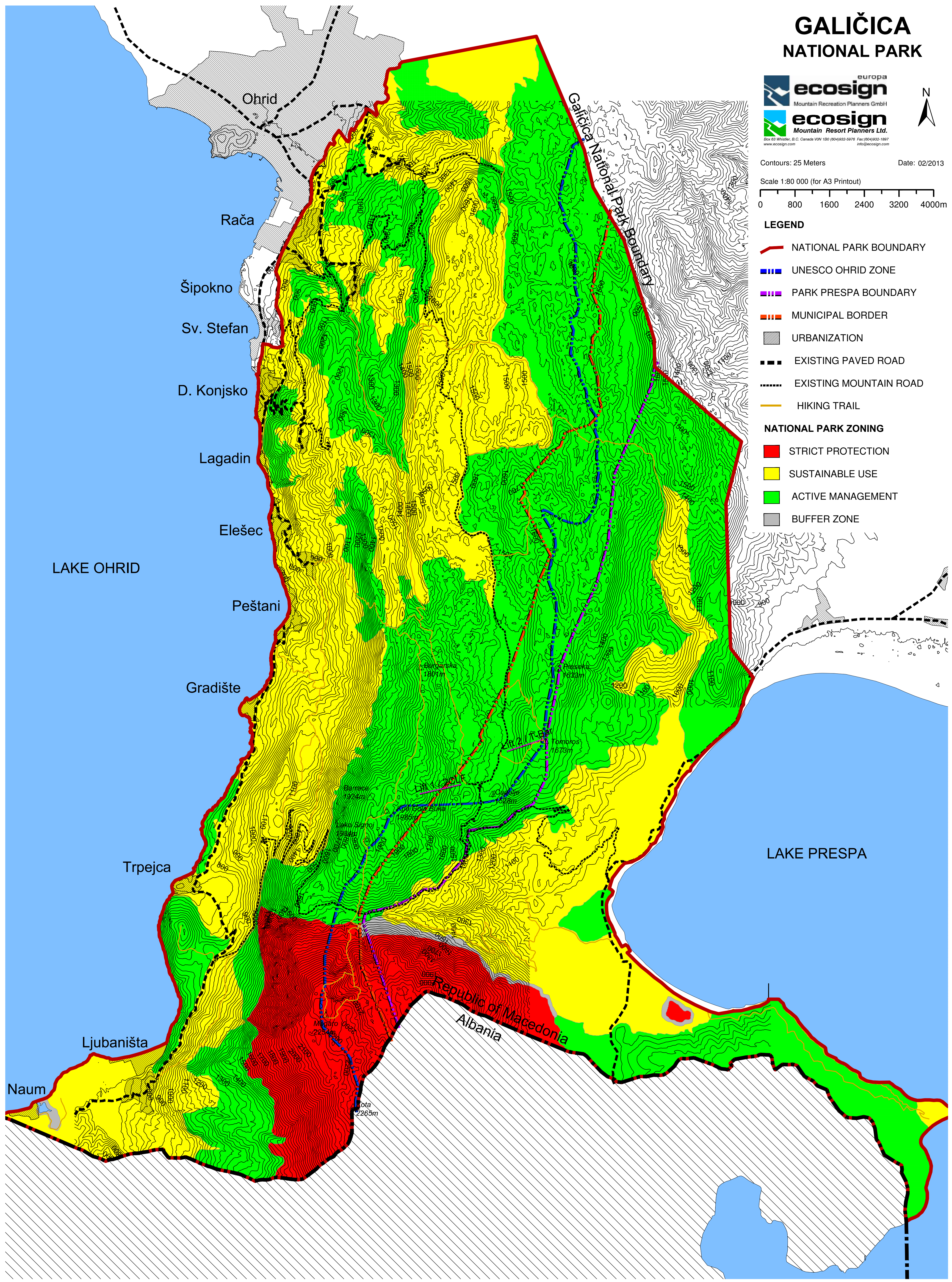

Figure II.5

NATIONAL PARK ZONING PLAN

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N

Contours: 25 Meters Date: 02/2013

Scale 1:80 000 (for A3 Printout)

0 800 1600 2400 3200 4000m

LEGEND

- DECEMBER 21
- JANUARY 21
- FEBRUARY 21

DEC 21 @ 09:00 hrs

Sun's Alt. = 16.3°
Sun's Az. = 143.3°
SUNRISE: 07:00 HRS
SUNSET: 16:10 HRS
MINUTES OF SUNSHINE: 550

JAN 21 @ 09:00 hrs

Sun's Alt. = 17.8°
Sun's Az. = 138.7°
SUNRISE: 06:58 HRS
SUNSET: 16:19 HRS
MINUTES OF SUNSHINE:561

FEB 21 @ 09:00 hrs

Sun's Alt. = 25.3
Sun's Az. = 132.7°
SUNRISE: 06:25 HRS
SUNSET: 17:17 HRS
MINUTES OF SUNSHINE: 652

LATITUDE = 41° 2.8' North
LONGITUDE = 20° 52.7' East
UTC +1 Hr

NORTH

JUNE 21
Az = 302.5°
19:11 hrs

JUNE 21
Az = 57.6°
04:06 hrs

SUMMER SOLSTICE

WINTER SOLSTICE

DEC 21
Az. = 238.8°
16:10 hrs

DEC 21
Az = 121.3°
07:00 hrs

SUNSET **SUNRISE**

Figure II.6A

SOLAR ANALYSIS 9 00 HRS

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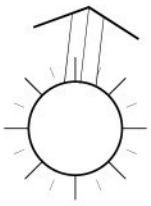
Contours: 25 Meters Date: 02/2013

Scale 1:80 000 (for A3 Printout)

0 800 1600 2400 3200 4000m

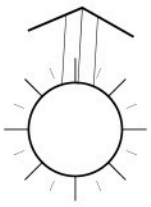
LEGEND

- DECEMBER 21
- JANUARY 21
- FEBRUARY 21



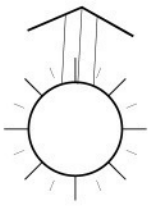
DEC 21 @ 12:00 hrs

Sun's Alt. = 25.3
Sun's Az. = 186.4°
SUNRISE: 07:00 HRS
SUNSET: 16:10 HRS
MINUTES OF SUNSHINE: 550



JAN 21 @ 12:00 hrs

Sun's Alt. = 29.1°
Sun's Az. = 183.3°
SUNRISE: 06:58 HRS
SUNSET: 16:19 HRS
MINUTES OF SUNSHINE:561



FEB 21 @ 12:00 hrs

Sun's Alt. = 38.5°
Sun's Az. = 183.1°
SUNRISE: 06:25 HRS
SUNSET: 17:17 HRS
MINUTES OF SUNSHINE: 652

LATITUDE = 41° 2.8' North
LONGITUDE = 20° 52.7' East
UTC +1 Hr

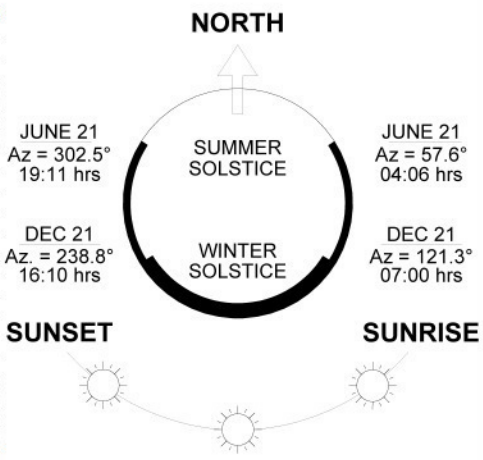


Figure II.6B
SOLAR ANALYSIS 12 00 HRS

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N

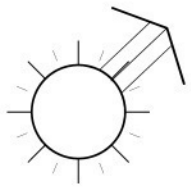
Contours: 25 Meters Date: 02/2013

Scale 1:80 000 (for A3 Printout)

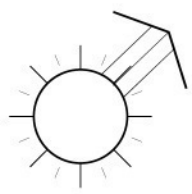
0 800 1600 2400 3200 4000m

LEGEND

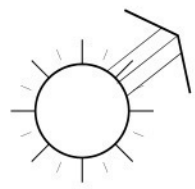
- DECEMBER 21
- JANUARY 21
- FEBRUARY 21



DEC 21 @ 15:00 hrs
Sun's Alt. = 10.0°
Sun's Az. = 226.6°
SUNRISE: 07:00 HRS
SUNSET: 16:10 HRS
MINUTES OF SUNSHINE: 550



JAN 21 @ 15:00 hrs
Sun's Alt. = 14.7°
Sun's Az. = 226.3°
SUNRISE: 06:58 HRS
SUNSET: 16:19 HRS
MINUTES OF SUNSHINE:561



FEB 21 @ 15:00 hrs
Sun's Alt. = 22.6°
Sun's Az. = 231.7°
SUNRISE: 06:25 HRS
SUNSET: 17:17 HRS
MINUTES OF SUNSHINE: 652

LATITUDE = 41° 2.8' North
LONGITUDE = 20° 52.7' East
UTC +1 Hr

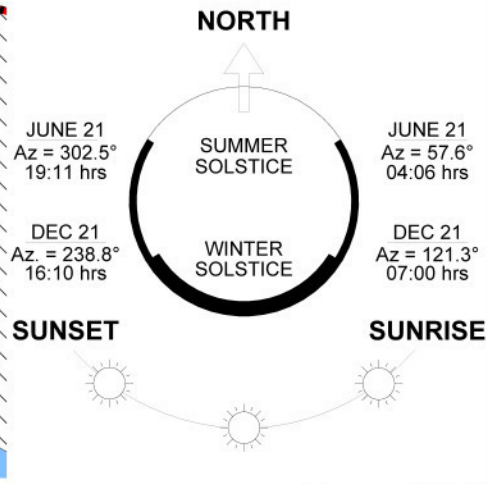


Figure II.6C

SOLAR ANÄLYSIS 15 00 HRS

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Contours: 20 Meters Date: 02/2013

Scale 1:80.000 (for A3 printout)

0 750 1.500 3.000 m

LEGEND

- EXISTING LIFT
- EXISTING PAVED ROAD
- EXISTING MOUNTAIN ROAD
- NATIONAL BORDER
- NATIONAL PARK BOUNDARY

SOLAR RADIATION

kWh/m²

- < 200
- 200 - 260
- 260 - 320
- 320 - 380
- 380 - 440
- 440 - 500
- 500 - 560
- 560 - 620
- 620 - 680
- > 680

* Notes:
Period of Calculation = Dec 1, 2012 - March 31, 2013
Number of Days Analyzed: 121 days
Daily Extents of Calculation = 03:00 hrs - 22:00 hrs
Interval of Calculation = 15 minutes

OHRID
Rača
Šipokno
Sv. Stefan
D. Konjsko
Lagadin
Elešec
LAKE OHRID
Peštani
Gradište
lift 2 / T-Bar
2CLF
Oteshevo
LAKE PRESPA
Trpejca
Stenje
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ALBANIA
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bing

Figure II.7

INCOMING SOLAR RADIATION ANALYSIS

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N

Contours: 5 Meters

Date: 02/2013

Scale 1:12.500 (for A3 printout)

0 125 250 500 m

Lift 2 / T-Bar

Lift 1 / 2CLF

Former Cafeteria

Former Beginner Area

Road to Lake Prespa -->

<-- Road to Lake Ohrid

LEGEND

- LIFT OUT OF OPERATION
- FORMER LIFT LOCATION
- EXISTING PAVED ROAD
- EXISTING MOUNTAIN ROAD
- NATIONAL BORDER

bing

Figure II.8

EXISTING MOUNTAIN FACILITIES PLAN

III. DEVELOPMENT ANALYSIS

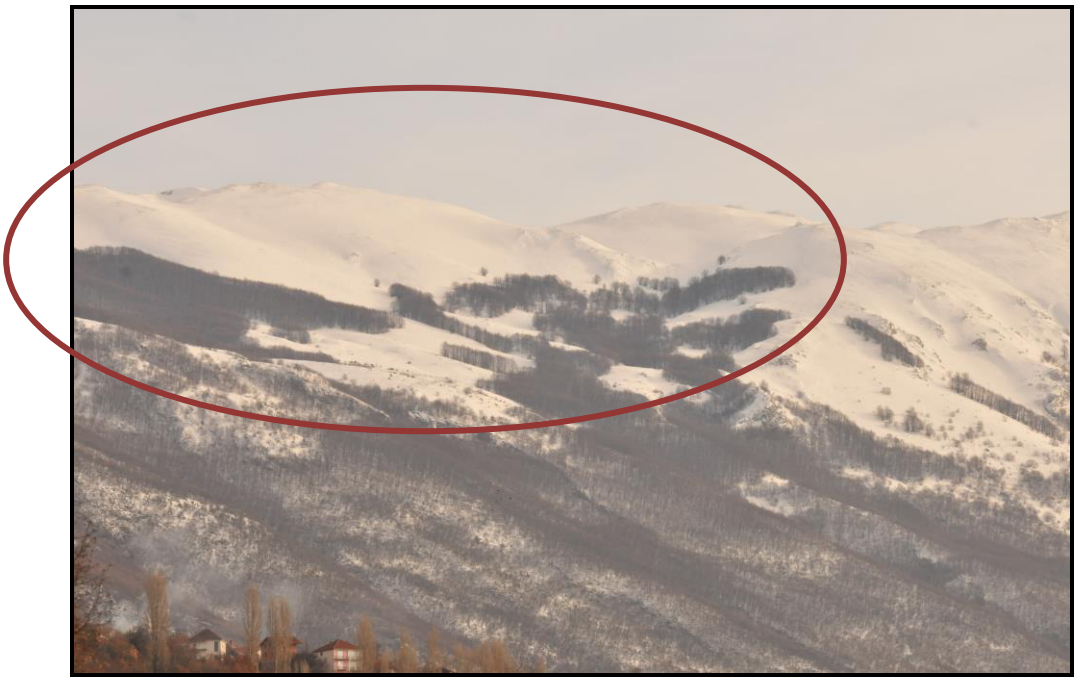
In Lot 2, Step 3 of the planning process this section was

replaced by report section VI.2.

IV. PRELIMINARY DEVELOPMENT CONCEPT

.1 Introduction

After completing the technical assessment and terrain suitability analysis, Ecosign has developed a preliminary development concept for the Galičica Ski Center. The overall vision for the Galičica Ski Center is to develop the previously identified "West Zone" and provide access to the ski center facilities exclusively by means of a gondola system from Lake Ohrid. This access gondola system also creates an opportunity for sightseeing and other 4-season recreation activities within the ski center and National Park. The buildout capacity of the Ski Center is planned for 3.000 skiers and includes a total of 6 lifts. Base area facilities include a day visitor parking area at the gondola terminal and two mountain restaurants. The following text summarizes the main characteristics and facilities of the proposed ski center.



Proposed ski-terrain above Lake Ohrid

.2 Goals and Objectives

A ski area Feasibility Study involves the elaboration of a Preliminary Development Concept. Based on this plan, an Order of Magnitude Capital Budget is developed and the Financial Analysis is prepared to determine if it is advisable to enter the subsequent planning phase to develop a detailed Master Plan.

The objectives of the Galičica Ski Center development plan are as follows:

- Optimize the utilization and operational efficiency of the proposed infrastructure.

- Balance lift and trail capacities wherever possible.
- Provide maximum capacity and comfort for minimum capital and operating costs.
- Provide base staging facilities (skier services, day skier parking, restaurant facilities, etc.) in balance with mountain access and capacity requirements.
- Optimize quality of the facilities to meet the expectations of the skier market.
- Develop beginner facilities and terrain and provide additional recreational activities other than skiing or snowboarding.
- Define goals and projects to guide the client and inform public agencies during the review and decision making period.

.3 Mountain Planning Parameters

Ski Lift and Ski Piste Design

When designing a system of lifts and ski pistes, the ultimate development should be planned in order that future lifts and additional ski pistes will not create conflicts, congestion, crowding or worn-out snow conditions. Utilization of various lift loading and unloading patterns, as well as ski piste grading can direct skiers onto preferred ski piste systems to improve ski piste utilization or avoid major congestion areas.

Ski pistes and slopes should be designed to provide the best skiing opportunities and then, subsequently, lifts located to best serve these ski pistes since lifts are merely a means of access. The type of lift may vary, depending on the natural terrain it must cross and serve, as well as the required hourly capacity and type of skier being served.

Typical Groomed Ski Piste

Lifts should not be located simply because good or suitable upper and lower terminal locations have been selected, or to minimize construction costs. There are many lift design alternatives available to accommodate a wide variety of sites. Lift construction costs, although important, should normally be a secondary consideration when compared to skiing quality, aesthetics or environmental factors. Ski lift loading and unloading terminals are preferably located in protected areas on slopes less than 20 percent. Adequate space must be allotted for lift queues, safe stopping, unloading areas and general congregation areas at both the upper and lower lift terminals. As a general rule, Ecosign allows between 1,5 and 2,5 square meters per skier for these congregation areas, depending upon anticipated queues and the capacity and type of lift.

When the majority of ski lift capacity is separated from the base area, it is important that the base area lift locations and capacity are designed for efficient distribution of skiers throughout the area's lift systems, within a 2-2,5 hours staging period.

Skier Carrying Capacity - Lifts

The determination of an area's Skier Carrying Capacity (SCC) is perhaps the most critical step in ski area planning. Often referred to as the "Comfortable Carrying Capacity" or "Skiers at One Time" (SAOT), this figure represents the number of skiers that can be safely supported by an area's lift and ski piste system, while providing a quality experience to each skier ability level. Skier Carrying Capacity is determined via the integration of lift capacity, operating hours, acceptable slope densities; slope gradients, skier skill classifications and vertical meters of lift serviced terrain. The resort base area development is planned to balance with the ideal mountain capacity.

Planning Parameters - Ski Pistes

In order to provide an accurate account of the ski piste system, we have classified each ski piste in concert with international ski piste standards, as well as the seven skier skill classification levels exhibited in the Technical Assessment section of this report. Ski pistes are classified according to an evaluation of the following parameters: slope width, average gradient and the steepest 30-meter vertical pitch. Since the average slope gradient of a ski piste is generally much lower than the steepest 30-meter vertical pitch, the ski pistes are usually classified to ensure that the steepest 30 meters falls within the acceptable terrain gradients. Furthermore, a gentle novice ski piste cannot suddenly turn into an advanced ski piste. For obvious reasons, a ski piste must be skiable from top to bottom for that particular skill class.

Ecosign has applied the same Mountain Planning Parameters as previously described in the Development Analysis section of this report. The planning parameters (skier densities, VTM demand and skill mix distribution of the skier market) are listed below in Table IV.1.

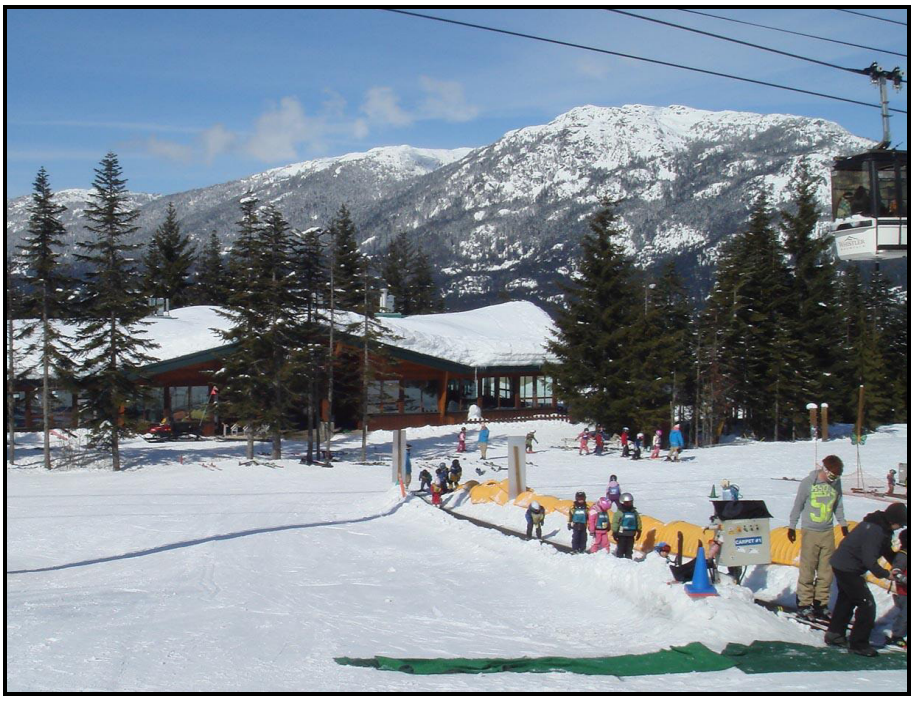
TABLE IV.1
MOUNTAIN PLANNING PARAMETERS

PISTE DESIGNATION	SKIER ABILITY LEVELS
Easier	Beginner & Novice Skiers
More Difficult	Intermediate Skiers
Most Difficult	Advanced & Expert Skiers

Skill Classification	Skill Mix	Acceptable Terrain Gradients	Skier Demand [VTM / Day]	Skier Densities [Skiers per ha] At Area	On Piste
1 Beginner	10%	8 - 15%	705	75	30
2 Novice	15%	15 – 25%	1595	75	30
3 Low Intermediate	20%	25 – 35%	2125	60	23
4 Intermediate	25%	30 – 40%	2830	60	23
5 High Intermediate	15%	35 – 45%	3840	45	18
6 Advanced	10%	45 – 60%	4460	22,5	10
7 Expert	5%	60% +	6370	30	15

Number and letter codes have been utilized to indicate the type of proposed lift installation in the preliminary Development Concept, as shown below.

8-MGD Monocable Detachable Eight-Passenger Gondola
4-CLF Fixed Grip Four-Passenger Chairlift
T-Bar Surface Lift for 2 Passengers per Carrier
PL Surface Platter Lift for 1 Passenger per Carrier
MC Moving Carpet Conveyor Lift
(for beginners and short distance uphill transportation)



MC-Moving Carpet (conveyor) lift for beginners

.4 Base Area Development Planning Parameters

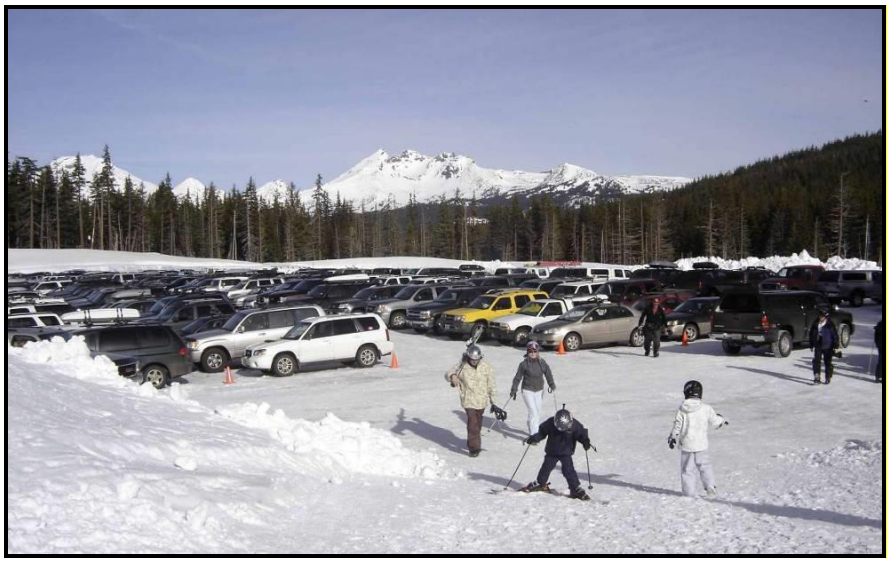
Base area development at mountain resorts typically includes access roads, overnight accommodation, commercial space, day-use parking, village pedestrian space and additional four-season recreational activities. The proposed Galičica Ski Center has limited base area development as a result of the presence of extensive existing overnight accommodation in the Ohrid region that is underutilized during the winter season. This existing bed base will serve as a winter bed base for the ski area and no new overnight accommodation is planned as part of the ski area development. However, there is an opportunity to integrate affordable group accommodation above the service buildings planned on the mountain. This option can be explored in detail at future phases of detailed planning following feedback from the client. Proposed base area facilities are limited to day visitor parking and service buildings at the bottom, mid-station and top of the access gondola, as shown in Figure IV.1. Skiers staying in overnight accommodation will drive or take a shuttle bus to the parking lot at the gondola base to access the ski center facilities.

Skiers from Parking

Visitors to the Galičica Ski Center will arrive by car or bus to the parking lot at the base of the gondola from where they can access the ski area's recreation facilities and commercial amenities. The capacity of day-use parking lots to generate skiers is calculated using assumptions of cars or buses per hectare and skiers per car or bus. Table IV.2 summarizes the parking assumptions used in determining capacity of the proposed parking area.

TABLE IV.2
PARKING ASSUMPTIONS

Number of Visitors Per Bus	30
Number of Visitors Per Car	3
Percentage of Bus Passengers Skiing	70%
Percentage of Car Passengers Skiing	70%
Buses per Hectare	70
Cars per Hectare	345



Typical Day Use Surface Parking Lot

.5 Ski Center Development Concept

Ecosign has prepared a general concept to illustrate the ski and base area development potential for the Galičica Ski Center. This initial preliminary ski center plan is conceptual in nature and as such, does not represent the level of detail required for a Master Plan document.

The Development Concept is illustrated on Figure IV.1 - Ski Center Development Concept – Overview Map and Figure IV.2 - Mountain Development Concept. The general alignment and type of lift systems are delineated on this plan, as well as conceptual piste locations, piste classifications and beginner zones. The pistes are shown with an average width of 35 meters, while skiways are shown at an average width of 15 meters.

The overall concept was created taking into consideration many factors, including identifying the best opportunities for developing skiing and the best lands for the development of staging facilities. Providing winter access to the alpine areas of Galičica National Park was a key design consideration as the existing mountain roads are not plowed during the winter and would require significant and costly improvements to provide suitable access for a commercial ski center. As an alternative to upgrading the existing mountain roads, Ecosign has proposed a gondola system on Lake Ohrid side of the National Park as the primary access for proposed ski area facilities. The gondola will also provide 4-season sightseeing opportunities and is an attractive tourism destination in its own right. The proposed mid-station creates the opportunity for return cycle skiing on the gondola, as well as a sheltered area for beginner skiers and other recreation activities. The gondola is the centerpiece of the Galičica Ski Center concept and provides an innovative, solution to the limitation of the existing road infrastructure within Galičica National Park, as well as added value to the Ski Center concept as a 4 season tourist attraction.

Mountain Facilities

The overall Galičica Ski Center Preliminary Concept is illustrated in Figure IV.1 and includes a total of 6 lifts; 1 detachable monocable eight-passenger gondola, 2 fixed grip quadruple chairlifts, 1 T-Bar surface lift, 1 platter surface lift and one moving carpet conveyor belt lift. Lifts in this configuration have a combined hourly capacity of 8.800 passengers per hour and support approx. 3.000 skiers per day. The specifications for the proposed Galičica Ski Center lifts are listed in Tables IV.5.

Lift 1

Ecosign recommends providing access for visitors to the alpine facilities at Galičica Ski Center with an eight-passenger gondola system. The proposed gondola has two sections with a mid-station at the elevation of 1580m and the top-station at an elevation of 1890m. A restaurant and service facility is proposed at both locations.

Eight-passenger gondola ropeway system with garage room for carriers

Lift 1 will have an hourly capacity of 1.500 passengers per hour. The first section (Lift 1a) is for access from and egress to the base area of skiers and non-skiing visitors only. The second section provides return-cycle-skiing at west-facing slopes above Lake Ohrid. This section will be able to support approximately 740 skiers at one time over 310 meters of vertical. This lift would service predominantly intermediate, high intermediate, advanced and expert ski terrain. Skiway S1 in combination with piste 1A and 4A will allow novice and low intermediate skiers to ski from the top of Lift 1 down to the mid-stations.

Beginners will have to unload at the mid-station and ski at the beginner zone at Lift 2. Novice skiers would either ski at the mid-mountain area at Lift 2 and Lift 3 or they can also go right to top and then ski the blue run at Lift 5 on the back side of the mountain. Lift 1b will also be the prime staging lift for Lift 4 and Lift 5 although there is another way to get to those lifts via Lift 3.

Mountain Top Restaurant

Lift 2

This lift will be a surface platter lift and caters ideal beginner terrain. Together with Lift 6/MC this area will constitute the beginner zone of the envisioned Galičica Ski Center. Lift 2 will be an ideal place for novice skiers who successfully made their first turns on skis at Lift 6/MC right next to this Lift. Lift 2 has a capacity of 600 pph. and can comfortably support up to 140 skiers at one time.

PL - Surface Platter Lift for 1 Passenger per Carrier

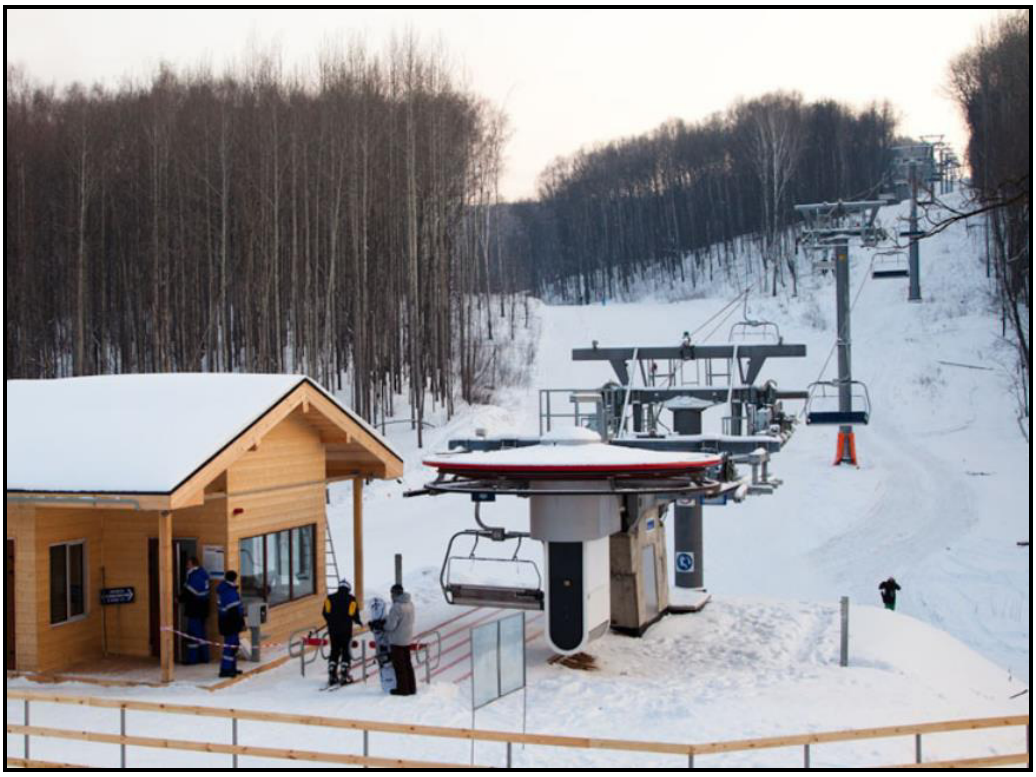
Lift 3

Lift 3 is envisioned to be a T-Bar lift located approximately 180m south of the mid-station. A skiway will be built for skiers to get there and back again. This lift caters novice and low intermediate terrain and thus will be a great progression for skiers coming from Lift 2. Lift 3 serves two pistes and offers 90 meters of vertical. This T-Bar has an hourly capacity of 1.000 passengers and will be able to support 170 skiers at one time.

T-Bar - Surface Lift for 2 Passengers per Carrier

Lift 4

Lift 4 is located about 430 meters south of the mid-station and can be accessed either from the top of Lift 1b or from the mid-mountain area via Lift 3. This lift is proposed as a fixed grip four-passenger chairlift with an hourly rated capacity of 1.600 skiers. The lift caters some of the best ski terrain within the envisioned Galičica Ski Center. Lift 4 serves six pistes for intermediate, high intermediate and advanced skiers with west to north-west facing terrain between 1580 and 1930 meters elevation. Lift 4 will be able to comfortably support approximately 980 skiers at one time.



4-CLF - Fixed Grip Four-Passenger Chairlift

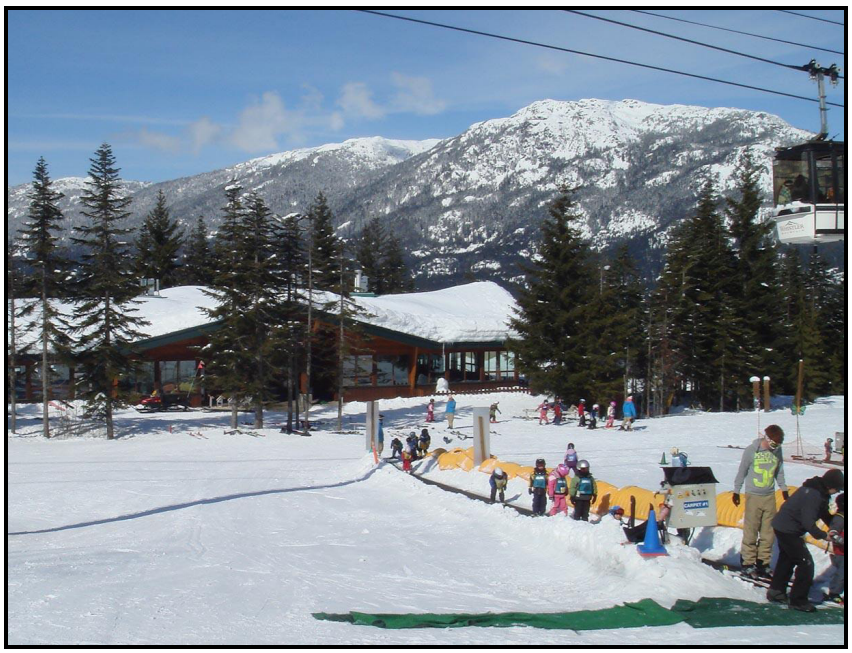
Lift 5

Lift 5 provides skiing on the east side of the mountain and will offer a wide variety of different piste difficulties from novice to expert terrain. Same as Lift 4 this lift is proposed as a fixed grip quadruple chairlift with a rated capacity of 1.600 skiers per hour. This lift will support approx. 820 skiers at one time and provides 230 meters of vertical.

Fixed Grip Four-Passenger Chairlift

Lift 6 - MC

A small beginner center will be situated between the mid-station of Lift 1 and the proposed mid-mountain lodge. This beginner center would comprise of 1 moving carpet conveyor belt lift of about 50 meters length and the previously described Lift 2. The moving carpet conveyor belt lift (MC) has a capacity of 1.000 passengers per hour and can accommodate approximately 60 skiers at one time.



Beginner Center with Magic (Moving) Carpet

Preliminary Concept Overview

The proposed developments of the Galičica Ski Center will have a capacity to support approximately 3.000 skiers at one time and the lift system will have a total hourly capacity of 8.800 passengers. The lift specifications for the preliminary Galičica Ski Center Concept are listed in Table IV.3, the piste balance by skill class is shown in Table IV.4 and Plate IV.1, and the lift and piste balance is illustrated in Plate IV.2. Overall, at buildout the proposed Galičica Ski Center will offer approximately 15 km of ski pistes with a total surface of approximately 52,5 hectares.

TABLE IV.3
PRELIMINARY CONCEPT - LIFT SPECIFICATIONS

Lift Number	**1a**	**1b**	**2**	**3**	**4**	**5**	**6**	
Lift Type	8MGD	8MGD	PL	T-Bar	4CLF	4CLF	MC	**TOTAL**
Top Elevation [m]	1.580	1.890	1.580	1.660	1.930	1.890	1.580	
Bottom Elevation [m]	730	1.580	1.550	1.570	1.580	1.660	1.573	
Total Vertical [m]	850	310	30	90	350	230	7	1.867
Horizontal Distance [m]	2.890	970	210	340	960	750	50	
Slope Distance [m]	3.012	1.018	212	352	1.022	784	50	6.451
Average Slope [%]	29%	32%	14%	26%	36%	31%	14%	
Rated Capacity [pph]	1.500	1.500	600	1.000	1.600	1.600	1.000	8.800
V.T.M./Hr.(000)	1.275	465	18	90	560	368	7	2.783
Rope Speed [m/sec]	5,0	5,0	2,0	2,0	2,5	2,5	0,9	
Trip Time [min]	10,04	3,39	1,77	2,93	6,81	5,23	0,93	
Operating Hr./Day	8,0	8,0	7,0	7,0	7,0	7,0	7,0	7,3
V.T.M. Demand/Day	*	3.224	705	1.844	3.411	2.660	705	
Loading Effic. [%]	95%	95%	80%	80%	85%	85%	90%	
Access Reduction[%]	60%	18%	0%	20%	0%	0%	0%	
Potential SCC [Skiers/Day]	**0***	**780**	**140**	**220**	**980**	**820**	**60**	**3.000**

* No Return-Cycle-Skiing on the first section of Lift 1

TABLE IV.4
PRELIMINARY CONCEPT - PISTE BALANCE BY SKILL CLASS
(LIFT SCC = 3.000)

Skill Classification	Hectares	Skiers	Balance	Ideal
1 Beginner	1,2	190	7%	10%
2 Novice	4,1	300	10%	15%
3 Low Intermediate	4,8	290	10%	20%
4 Intermediate	20,5	1.220	42%	25%
5 High Intermediate	12,5	560	19%	15%
6 Advanced	7,4	160	6%	10%
7 Expert	6,1	180	6%	5%
TOTALS	52,5	2.780	100%	100%
	Average Density =	53,1	Skiers / Hectare	
	Optimum Density =	55,7	Skiers / Hectare	
	Weighted Demand =	2.997	VTM / Skier / Day	

Plate IV.1 illustrates the piste balance of the Galičica Ski Center Development Concept by skill class. As shown in the plate, the ski area concept provides a wide variety of ski terrain with ski pistes for each skill class. The balance is not far from ideal although there is a significant excess of intermediate terrain and a minor excess of pistes for high intermediate and expert skiers. Beginner, novice, low intermediate and advanced pistes are slightly underrepresented. However, this distribution can be optimized when doing a more detailed piste planning for a master plan concept.

GALIČICA SKI CENTER – PRELIMINARY CONCEPT
PISTE BALANCE BY SKILL CLASS

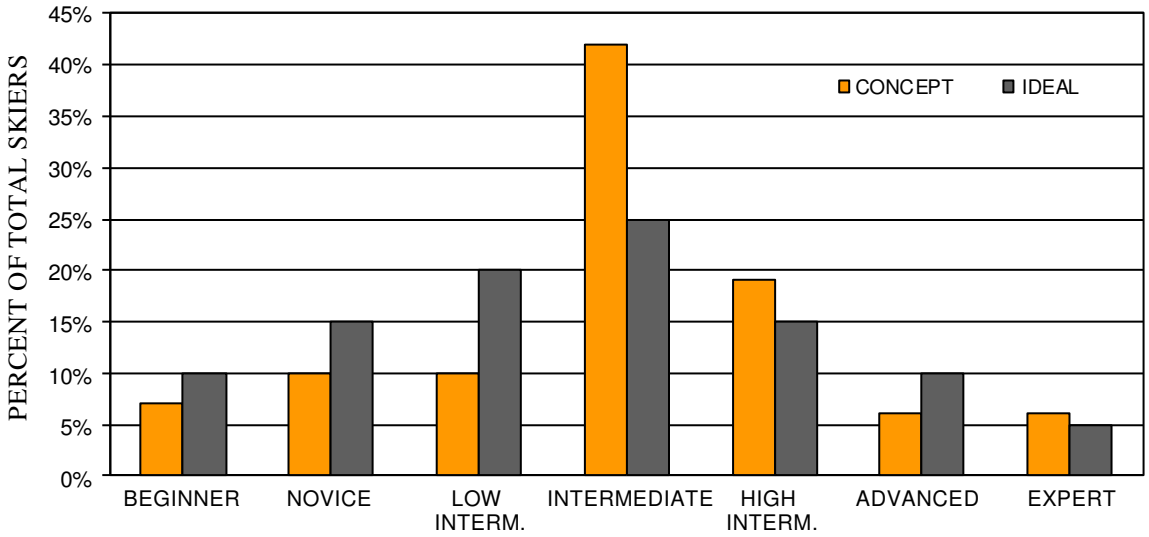


PLATE IV.1

West-facing ski terrain above Lake Ohrid that is proposed to be develop

As the following plate shows, the proposed lift and trail design results in a good capacity balance.

GALIČICA SKI CENTER – PRELIMINARY CONCEPT
LIFT AND PISTE BALANCE STATEMENT

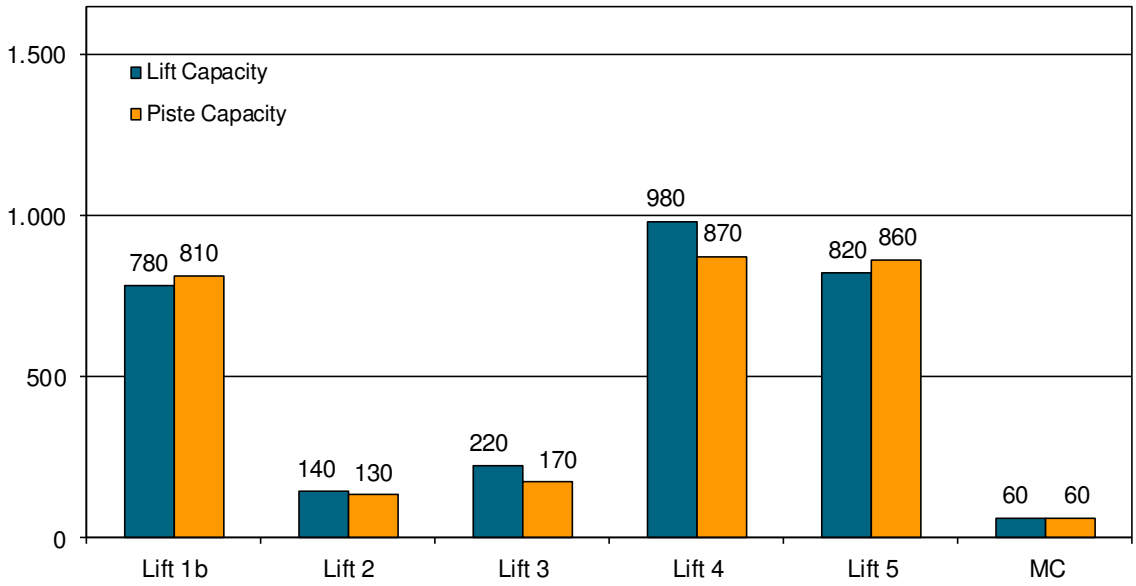


PLATE IV.2

Snowmaking

The study of climate and meteorological data in Section I of this report has shown that artificial snowmaking will be required to some extend in order to back-up future investment into the ski center. Natural snowpack seems to vary remarkably from year to year. Artificial snowmaking will help to extend the length of the ski season as it usually allows to start ski area operation at the beginning of December and to extend the season to the end of March. A detailed snowmaking concept with calculation of water requirements would be part of the master plan concept.

Other Recreational Facilities

Winter recreational facilities other than skiing and snowboarding are an important part of the winter tourism business as they will make the ski area more attractive for non-skiing visitors and also for beginner skiers, who are less inclined to spend all their time skiing or snowboarding. In a market such as in Macedonia and surrounding countries, with many potential visitors unfamiliar with skiing, other winter activities are one way to attract first time visitors and familiarizing them with activities in a winter environment.

The following additional recreational activities are suitable for the Galičica Ski Center and are planned around the mid-mountain base and at the top of the gondola:

- Snow Tubing
- Children's Snow Play
- Snowshoeing
- Sledding
- Snow Bikes
- Children's Snowmobile Course
- Nordic Skiing

Snow Tubing

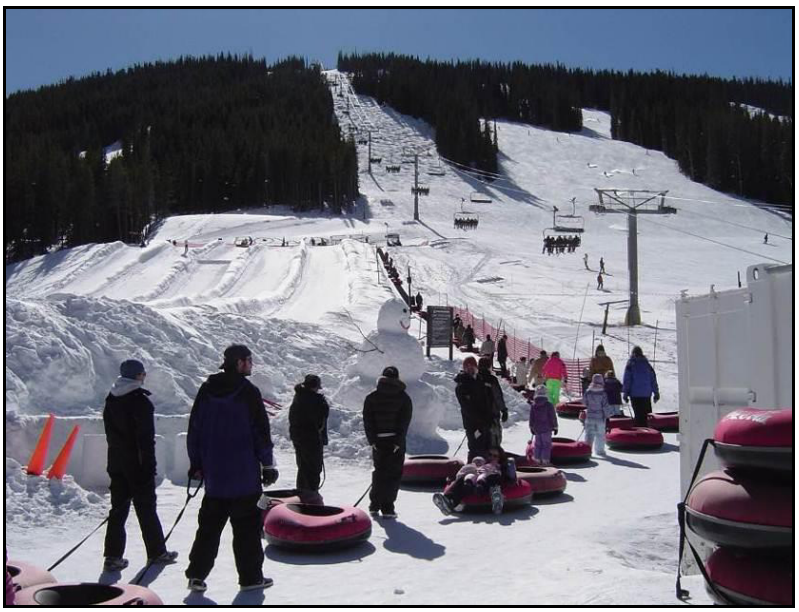
Snow tubing is a very popular activity at winter resorts. It requires no special skills or athletic abilities to participate, making it suitable for almost everyone. Tubes and riders are transported uphill by a mechanical lift, and then choose a tubing lane and slide down in the tube. Lanes are groomed for various experiences and skill levels.

Ecosign proposes to construct a Snow Tubing facility near the mid-mountain area as shown on Fig. IV.2. The Snow Tubing facility shall provide an alternate activity for those guests who do not wish to ski or snowboard. Tubing is also a very popular evening activity for youth and families.

A Snow Tubing Center can be constructed with a reasonable investment and has the potential to generate significant revenue for the resort with minimal associated operating costs. Many winter resorts service the tubing lanes with a dedicated lift such as a Moving Carpet or cable/handle rope system.

Snow Tubing Area

At the top of the tubing lanes there is a start area where tubers prepare themselves for launching down the tube lanes. A starter attendant gives the signal for the tubers to start when the lane is clear of tubers below.



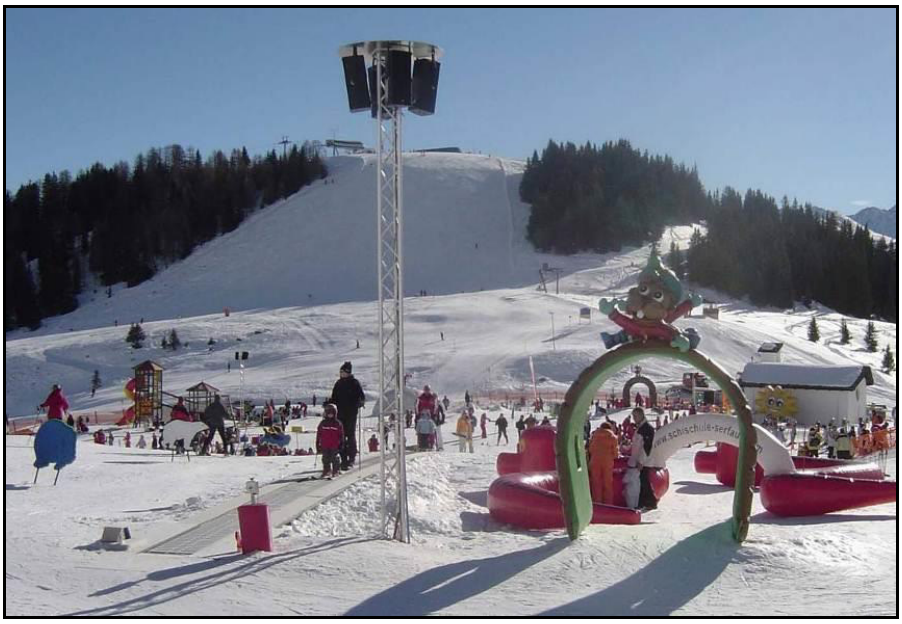
Tubing Lanes and Run-Out Areas

The starting/acceleration zone has a slope gradient of around 25 percent for 5 to 10 meters of vertical drop. Each lane is shaped with a slight depression in the center and a berm on each side to keep the tubes within their respective lanes.

As the tube rider progresses down the tube lane, the slope gradient decreases. The bottom of the lane has a flat run-out and deceleration zone that may even include a slight counter-slope area at the end to slow down and then stop the tubes. The average gradient between the start zone and the stopping point of the tubes is approximately 11 percent, depending on the types of tubes used. A tubing area, approximately 150m long, is planned in the mid-mountain zone.

Children's Snow Play Zone

In order to keep the children interested during their visit to the Ski Center, many play activities can be offered at the facility. These play features include small fort towers with slides, swing sets and teeter-totters, a kid's igloo or log cabin, a bounce room for very young children, and a tubing hill for those 6 years of age and over. Activities such as these entice non skiing children to visit the area and take part in the fun activities. Snowplay and a Children's zone is planned at the mid-mountain zone of the Galičica Ski Center.



Moving Carpet Conveyor Belt Lift with Arches and Play Area

Igloo

Snowshoe Trails

Snow shoe trails do not need any infrastructure other than signage and are best located following the same routes as the unpaved, smaller summer hiking trails, ideally the ones that have a varied intimate feel going in and out of the trees and offering natural features and vistas. Snowshoeing can be offered at the mid-mountain zone as well as in the alpine areas at the top of the gondola.

Snowshoeing

Sledding or Schlittelbahn

Sledding can be offered in many ways; daytime and night time, at a small scale or at a grand scale such as the Bussalp in Grindelwald/CH. The steepness of a long sledding slope is between 5 and 10 percent. A continuous slope is not necessary, as it is easy to walk short distances pulling the sled. At Galičica Ski Center, there may be an opportunity to provide this activity at the mid-station terminal.

Sledding in Bussalp, Grindelwald

The Snowbike

Originally called "skibobs," Snowbikes have been used for decades by seated gliders, mainly in Europe. Newest models are extremely light, efficient, and easy to maneuver. Some Snowbikes can even be immediately disassembled for transport on an aerial tram or gondola lift. In some ski resorts these snow bikes are rented from the ski rental shop and they are allowed on the ski slopes as they don't create conflicts with skiers and snowboarders.

Snowbiking

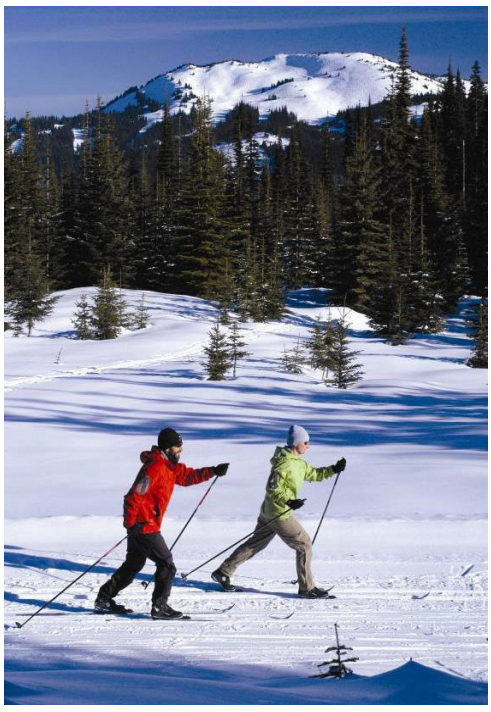
Children's Snowmobile Course

A mini snowmobile track for children and families can be constructed at the mid-mountain base so that it is easy to access for parents and children. The mini-snowmobile's only require the area of two tennis courts for a "closed circuit" track for children.

Mini Ski-Doo

Nordic Skiing / Cross-Country Skiing

Nordic / Cross-country ski trails can be developed on gentle terrain that is too flat for commercial skiing. Ideally, the cross-country ski trails are easily accessible from the ski area service buildings, however there should be as little conflict as possible between cross-country ski trails and alpine ski trails. Summer facilities such as paved bike trails or a golf course can be used as cross-country ski terrain in the winter.



Nordic Skiing

There is an opportunity to provide Nordic ski trails on the flat topography at the mid-mountain zone as well as in the alpine areas at the top of the gondola.

Base Area Facilities

Base area facilities for the Galičica Ski Center include a parking area at the bottom of Lift 1 and three skier service buildings located at the bottom, mid-station and top terminal of the gondola.

Day Visitor Parking

The planning parameters outlined in Table IV.5 are applied to determine parking requirements for the proposed Galičica Ski Center. The optimal location for a parking area was determined in the Development Analysis as a result of an analysis of slope gradients and proximity to existing infrastructure. The parking area illustrated in Figure IV.1 is well connected to the tourism development around the village of Gradište and can be easily accessed from the existing road along the shore of Lake Ohrid. The 3,7 hectare parking lot would require minimal earthworks and is entirely within comfortable walking distance from the bottom of Lift 1.

Ecosign was informed by Galičica National Parks staff that the area around the proposed parking lot may be private property, however according to our maps it is located within the National Park Boundary in an area zoned for sustainable use. Further investigation of the development restrictions in this area should be explored at the next step in the planning process.

It should be noted that the proposed by-pass road between Ohrid and Saint Naum is shown on Figure IV.I. It is unclear at this time when the road will be constructed but there is currently a framework plan for the project that will progress over the period between 2013-2019. This road can be considered in further detail at the next step in the planning process.

Table IV.5 provides a summary of the capacity of the proposed day visitor parking lot. The lot can accommodate 1.227 cars and 10 buses which could deliver up to 4.281 visitors and over 3.000 skiers to the Ski Center Facility. It is anticipated that up to 300 skiers will be dropped off by shuttle bus from surrounding hotels.

TABLE IV.5
PARKING CAPACITY

	Area Ha.	No. Cars	No. Buses	Visitors from Cars	Visitors from Buses	Visitors from Shuttles	Total Visitors	Total Skiers
Day visitor parking	3,7	1.227	10	3.681	300	300	4.281	3.057

Skier Service Facilities Programing

Base area land use facilities planned at the Galičica Ski Center include a day visitor parking lot and three service buildings located at the lower, middle and top terminals of the Lift 1 gondola. Skier service facilities are those facilities which provide functions specifically related to the operation and management of the ski area. For planning purposes, these services can generally be broken down into three distinct categories:

1. **Staging Facilities** - include ticket sales, public lockers, equipment rental and repair, ski school, and children's programs. These facilities are located in the arrival areas and should be sized in relation to the number of skiers staging through each base area.

2. **Commercial Facilities** - those services required throughout the day as skiers are on the mountain and during après-ski hours.

3. **Operational Facilities** - those services not directly required by skiers but which are essential for the day-to-day operation of the ski area.

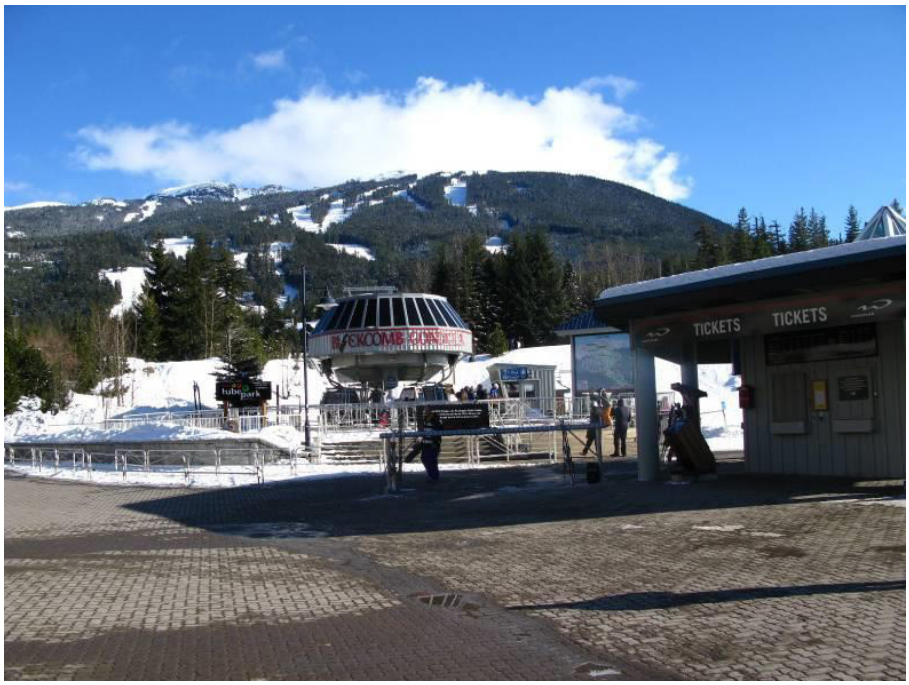
Staging facilities

Staging facilities are required by most visitors, these services include ticket sales, restrooms, information, lockers, equipment rental and repair, ski school and children's programs. These services should be located at the bottom terminal of the access gondola (Lift 1).

Tickets

Since almost all lift tickets are purchased before noon, a southeast orientation maximizes solar exposure and hence, improves guest comfort. Lineups for lift tickets must be arranged so that distinct lines of up to 25 people can be formed. Ticket areas should have temporary ski and snowboard racks nearby to allow sliders to easily set their equipment aside while purchasing tickets. As patrons approach the ticket windows, shelves are needed for guests to place goggles, gloves and hats while reaching for their wallet or credit cards. Rates should be posted for every two windows for easy reading to speed up the exchange. Many areas find it useful to heat the area overhead the last two or three spaces in line where, during inclement weather, bare hands must be used to complete the ticket purchase.

Ticket windows and guest services should be located at the bottom of Lift 1 adjacent to the parking lot and arrival area.



Ticket Window

Information / Guest Services

Information services are generally handled at an information wicket adjacent to the ticket windows or, alternatively, at a counter space which doubles as the reception for the area's administrative offices. This service disseminates information pertaining to everything from weather conditions to special ski programs and events. The information center should be staffed by polite and knowledgeable personnel.

Restrooms

Restrooms are required for visitors arriving in the day use parking lot, as well as adjacent to food and beverage outlets. Quite frequently restrooms are located in basement spaces and can have both indoor and outdoor entrances to minimize congestion. Restrooms for staging should be located at the bottom of Lift 1 as well as in the restaurants at the mid-mountain area and on the mountain top.

Public Lockers

Public lockers provide space for day visitors to store bags and extra equipment and for season's pass holders to store their skis throughout the season. Lockers are a potential revenue generator for the ski area and are typically located adjacent to washrooms and lunch areas. Lockers are planned at the mid-mountain terminal at the Galičica ski center.

Public Lockers

Ski/snowboard and sport equipment rental/repair

Ski and snowboard rental and repair shops are also very high volume businesses which must outfit large numbers of guests with full equipment packages within a two hour period. Ideally, the ski area rental shops will have an entry corridor where clientele fill out forms and examine the rate sheets then move into an equipment fitting area which exits directly onto the skier congregation area. During the afternoon periods, the morning exit becomes the afternoon entrance as renters return equipment and pick up their identification and deposits.

Rental Shop and Equipment Storage

Rental space is planned at the bottom terminal and mid-station of Lift 1. While providing rentals at the mid-station is more convenient for skiers, Ecosign recommends planning some rental space at the bottom of the Gondola to avoid some of the transportation requirements for equipment and goods up and down the gondola.

Daycare/Children's Ski School

A daycare and children's ski school center is essential at ski resort areas. Experience has shown that well run, professionally staffed daycare centers can provide significant revenues to an area, while encouraging increasing participation in skiing by families. The daycare center is situated slightly away from the main activity areas, with direct access to a small, fenced snow play or handle tow area. The nursery/daycare building should provide special food preparation and toilet facilities, as well as room for general play, crafts and nap periods. Children's facilities are planned at the mid-mountain.

Children's Ski School Gathering Area

Children's Ski School Food Service Seating

Commercial Facilities

Commercial facilities include retail outlets, food and beverage facilities and restrooms. Various commercial services are planned at the three service locations at the bottom, mid and top terminals of Lift 1. Commercial facilities are located both in the arrival area and on the mountain and include food and bar seating, kitchen and serving areas, restrooms and accessory retail space. Restaurant seats should be planned relative to the number of skiers circulating in the vicinity of the proposed restaurant sites. Kitchens and restrooms must be sized in proportion to the amount of seating proposed for each restaurant.

Retail ski shop

Retail shops for day skiers and snowboarders generally experience high volumes of business on accessories such as; goggles, ski poles, gloves, hats, etc. The retail shops should have windows and a covered entrance directly accessible from the three skier service areas planned as part of the Galičica ski center.

Food & Beverage Services

Food and beverage services are utilized throughout the day. Where possible, these facilities should have views of the mountain slopes and good sun exposure. A full service restaurant is proposed at the top terminal of Lift 1 and a self-serve kiosk is proposed within the mid-mountain service building. A small coffee shop should be integrated into the skier service building at the bottom of the gondola.

Alpine Mountain Restaurant in Davos, Switzerland

Operational Facilities

Operational facilities are generally “back of the house” services and include administration, employee lockers and ski patrol facilities. While there are no set rules for the spatial location of the area administration and other service functions, administration and staff lockers are frequently situated in the basement, or north facing sides of the buildings. The first aid and ski patrol requires direct access from the slopes to allow the patrol to bring in accident victims by toboggan. There must also be direct ambulance access to the first aid room from a vehicular terminus zone or parking lot. Preferably, the first aid room should be situated in an area which is not highly visible to the majority of the area's clientele.

Proposed Skier Service Facilities program

A program for skier services relating to the three primary categories of Staging Facilities, Commercial Facilities and Operational Facilities has been developed based on the buildout SCC capacity of the Galičica Ski Center Preliminary Concept. Table IV.6 lists Ecosign’s recommended planning standards for the amount of skier service space per skier for each of the 12 skier service functions planned for the Galičica Ski Center. These standards have been developed over several years and incorporate data from ski areas in Europe, North America and Asia. The standards have been customized according to the specific characteristics of the Macedonian market as well as the particular attributes of the proposed Galičica ski center concept. Skier service facilities are planned for 80% of the buildout SCC which is referred to as the “Design Day”. The “Design Day” represents business levels on an average busy day, but is not the peak day.

Services are planned for "Design Day" business levels so facilities can comfortably accommodate busy days, but are not overbuilt which would result in underutilization for the majority of the season.

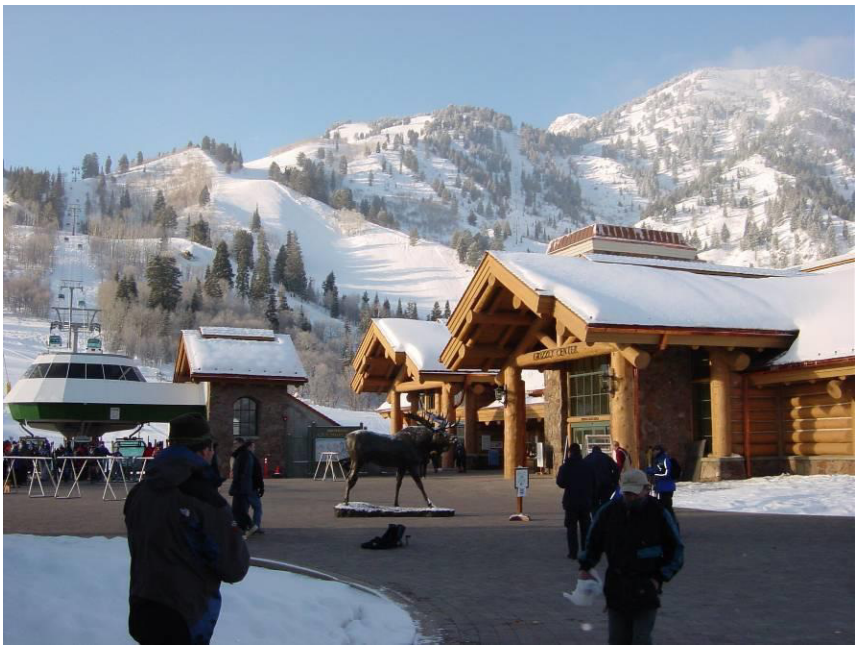
Ecosign's recommended standards for floorspace per skier are applied to the "Design Day" business levels to determine a space use program in Table IV.6. A total of approximately 3.030m² of skier service space is proposed over three skier service buildings located at the bottom, mid-station and top terminal of the Lift 1 gondola.

TABLE IV.6
SKIER SERVICES FACILITIES PROGRAM
GALIČICA SKI CENTER

Buildout SCC	**3.000**
Design Day (80% of SCC)	**2.400**

Guest Service Function	Ecosign Recommended Standards m²/skier	Recommended Floor Space m²
Staging Facilities		
Ticket Sales	0,09	216
Public Lockers	0,04	96
Equipment Rental & Repair	0,075	180
Restrooms for Staging	0,02	48
Guest Services/Snow Sport School	0,02	48
Children's Programs	0,02	48
Staging Subtotal	**0,265**	**636**
Commercial Facilities		
Food & Beverage Seating	0,4	960
Kitchen & Scramble	0,15	360
Restrooms	0,08	192
Accessory Retail	0,05	120
Commercial Subtotal	**0,68**	**1.632**
Operational Facilities		
Administration	0,025	60
Employee Facilities	0,02	48
First Aid & Mountain Patrol	0,02	48
Operations Subtotal	**0,07**	**156**
Total Net Functional Space	**1,01**	**2.424**
Storage (10%)	0,1	242
Mechanical/ Circulation/ Walls/ Waste	0,15	364
Total Building Floorspace	**1,260**	**3.030**

During the next phase of planning, a detailed program for each proposed building with corresponding conceptual floor plan should be developed.



Skier Service Lodge and Staging Gondola

Proposed Phasing

For future development of the Ski Center Galičica we propose an organic growth which ideally goes in line with the market demand predictions. Thus the realization should happen in stages, according the actual growth of visitation numbers. For calculation of the Capital Budget and the Financial Feasibility Analysis we have applied three stages of realization which we think would be the most suitable for this project. However the phasing will be depending on several factors and can be adjusted in upcoming planning phases based on strategic decisions or financial restrictions. Hereafter an outline of the main proposed infrastructure developments for each stage of realization. More detailed information is provided in Section V – Capital Budget of this report document.

Phase 1

Most investments will be required for start-up of the Ski Center Galičica. Lift 1, the proposed gondola system has to be realized in Phase 1 in order to provide access to the mountain and the ski terrain. Therefore also the proposed construction road will need to be built. Furthermore it is recommended to build the Snow Tubing, the Beginner Area (Lift 2/PL and the Moving Carpet) and Lift 3/T-Bar in this stage of development. Phase 1 will offer approximately 23 hectares of ski pistes which can be maintained by one grooming machine. A maintenance building with approximately 200m² needs to be installed an can then be expanded later when more grooming machines will be required. About 600 parking stalls will be required to match the skier carrying capacity of the ski center. The Base Lodge, Mid Mtn. Lodge and Mtn. Top Lodge will be required from the beginning. We propose to first only build the floor space required for the first two phases of development and later to add-on to the buildings to reach the Build-out scope. The proposed Phase 1 has a Skier Carrying Capacity of 1.500 skiers per day.

Phase 2

In this Phase we propose to expand the ski terrain to the east and to build Lift 5. Approximately 15 hectares of ski pistes will be added to the ski area. Therefore a second grooming machine will be required in this phase and the maintenance building should be expanded along with this. Also the capacity of the parking area will need to be extended to approx. 1000 stalls in order to match demand. Phase 2 will have a skier carrying capacity of 2.250 skiers per day.

Build-out

Installation of Lift 4 / 4CLF will be the main step to reach the afore described build-out stage of the envisioned Ski Center as illustrated on Figure IV.1 – Ski Center Development Concept. Apart from the lift installation an additional grooming machine, auxiliary building floor spaces and parking stalls will be the biggest investments to reach build-out. Snowmaking should also be installed in Build-out Phase to back-up ski area operation and protect the investments from impact by poor snow seasons. The total capacity of the Ski Center Galičica will be 3.000 skiers per day.

GALIČICA
NATIONAL PARK

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www.ecosign.com

Contours: 5 Meters Date: 03/2013

Scale 1:15.000 (for A3 printout)

0 125 250 500 m

LEGEND

- PROPOSED PISTE
- PROPOSED LIFT
- ALTERNATIVE LIFT ALIGNMENT
- EXISTING LIFT OUT OF SERVICE
- SNOWSHOE/NORDIC TRAIL
- PROPOSED CONSTRUCTION ROAD
- EXISTING PAVED ROAD
- EXISTING MOUNTAIN ROAD
- KIOSK/RESTAURANT
- MAINTENANCE FACILITIES
- SKIER SERVICE FACILITIES

PISTE DIFFICULTY

- EASY
- MORE DIFFICULT
- MOST DIFFICULT

2CLF
Lift 5 / 4CLF
Lift 4 / 4CLF
Lift 1b / 8MGD
Lift 3 / T-Bar
Lift 2 / FL
MC
Lift 1a / 8MGD
Alternative Alignment Lift 1 / 8MGD
LONG-TERM ROAD PROJECT
Snow Tubing
Children´s Snowmobile Course
MID-MOUNTAIN ZONE
Day Visitor Parking
3,6ha/1.200 cars
Gradište
Peštani
© 2010 DigitalGlobe © 2010 GeoEye © 2013 Microsoft Corporation

Figure IV.1

SKI CENTER DEVELOPMENT CONCEPT - OVERVIEW MAP

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Contours: 5 Meters Date: 03/2013

Scale 1:7.500 (for A3 printout)

0 75 150 300 m

1655 2CLF 1600 5D 5B 5A 5E 5F 5C Lift 5 / 4CLF 4F 1950 1890 1925 4A 4B 4C 1850 1A 1B 1C S1 1D 4D 4E Lift 1b / 8MGD Lift 4 / 4CLF 1E 1650 1660 3A 3B Lift 3 / T-Bar 1700 1590 1580 Snow Tubing Children´s Snowmobile Course SS MC Lift 2 / PL 2A MID-MOUNTAIN ZONE Lift 1a / 8MGD bing © 2010 DigitalGlobe

LEGEND

- PROPOSED PISTE
- PROPOSED LIFT
- EXISTING LIFT OUT OF SERVICE
- SNOWSHOE/NORDIC TRAIL
- PROPOSED CONSTRUCTION ROAD
- EXISTING PAVED ROAD
- EXISTING MOUNTAIN ROAD
- KIOSK/RESTAURANT
- MAINTENANCE FACILITIES
- SKIER SERVICE FACILITIES

PISTE DIFFICULTY

- EASY
- MORE DIFFICULT
- MOST DIFFICULT

Figure IV.2

MOUNTAIN DEVELOPMENT CONCEPT - BUILDOUT

V. CAPITAL BUDGET

In Lot 2, Step 3 of the planning process this section was

replaced by report section VI.3.

VI. STEP 3 - UPDATE

After completion of the Feasibility Study and after finding a mutual agreement on the framework of the Masterplan (Annex No 1) we received topographic mapping of the Lake Prespa area. We have meanwhile analyzed and studied this area to the same level of detail and with the same methodology as we did for the rest of the National Park. The Inventory Analysis Figures have been updated and also the entire Development Analysis section has been reviewed and completed with the Lake Prespa area. The updated Figures are included as Section VI.1 - Technical Analysis Maps – Update and the updated Development Analysis is described in section VI.2.

.1 Technical Analysis Maps Update

Attached are the Figures VI.1 through VI.10b.

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N

Contours: 20 Meters Date: 12/2013

Scale 1:80.000 (for A3 printout)

0 750 1.500 3.000 m

LEGEND

- EXISTING LIFT
- EXISTING PAVED ROAD
- EXISTING MOUNTAIN ROAD
- NATIONAL BORDER
- NATIONAL PARK BOUNDARY

ASPECT

- FLAT
- NORTH
- NORTH-EAST
- EAST
- SOUTH-EAST
- SOUTH
- SOUTH-WEST
- WEST
- NORTH-WEST

OHRID
Rača
Šipokno
Sv. Stefan
D. Konjsko
Lagadin
Elešec
LAKE OHRID
Peštani
Gradište
Lift-2 / T-Bar
2CLF
Oteshevo
LAKE PRESPA
Trpejca
Stenje
REPUBLIC OF MACEDONIA
ALBANIA
Ljubaništa

bing
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Figure VI.1

ASPECT ANALYSIS - UPDATE

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Contours: 20 Meters Date: 12/2013

Scale 1:80.000 (for A3 printout)

0 750 1.500 3.000 m

LEGEND

- EXISTING LIFT
- EXISTING PAVED ROAD
- EXISTING MOUNTAIN ROAD
- NATIONAL BORDER
- NATIONAL PARK BOUNDARY

ELEVATION [m]

- < 900
- 900 - 1.100
- 1.100 - 1.300
- 1.300 - 1.500
- 1.500 - 1.700
- 1.700 - 1.900
- 1.900 - 2.100
- > 2.100

OHRID
Rača
Šipokno
Sv. Stefan
D. Konjsko
Lagadin
Elešec
LAKE OHRID
(690m)
Peštani
Gradište
Trpejca
Ljubaništa
Lift 2 / T-Bar
2CLF
Oteshevo
LAKE PRESPA
(842m)
Stenje
REPUBLIC OF MACEDONIA
ALBANIA

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Figure VI.2

ELEVATION ANALYSIS - UPDATE

GALIČICA
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Contours: 20 Meters Date: 12/2013

Scale 1:80.000 (for A3 printout)

0 750 1.500 3.000 m

LEGEND

- EXISTING LIFT
- EXISTING PAVED ROAD
- EXISTING MOUNTAIN ROAD
- NATIONAL BORDER
- NATIONAL PARK BOUNDARY

SLOPE [%]

- < 8
- 8 - 25
- 25 - 45
- 45 - 70
- > 70

OHRID
Rača
Šipokno
Sv. Stefan
D. Konjsko
Lagadin
Elešec
Peštani
LAKE OHRID
Gradište
Trpejca
Ljubaništa
Lift 2 / T-Bar
2CLF
Oteshevo
LAKE PRESPA
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Figure VI.3

MOUNTAIN SLOPE ANALYSIS - UPDATE

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Contours: 20 Meters Date: 12/2013

Scale 1:80.000 (for A3 printout)

0 750 1.500 3.000 m

LEGEND

- EXISTING LIFT
- EXISTING PAVED ROAD
- EXISTING MOUNTAIN ROAD
- NATIONAL BORDER
- NATIONAL PARK BOUNDARY

BASE SLOPE ANALYSIS [%]

- 0 - 8%
- 8 - 15%
- 15 - 25%
- 25 - 40%
- > 40%

OHRID
Rača
Šipokno
Sv. Stefan
D. Konjsko
Lagadin
Elešec
LAKE OHRID
Peštani
Gradište
Lift 2/T-Bar
2CLF
Oteshevo
LAKE PRESPA
Trpejca
Stenje
REPUBLIC OF MACEDONIA
ALBANIA
Ljubaništa

bing
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Figure VI.4

BASE AREA SLOPE ANALYSIS - UPDATE

GALIČICA
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N

Contours: 25 Meters Date: 12/2013

Scale 1:80 000 (for A3 Printout)

0 800 1600 2400 3200 4000m

LEGEND

- NATIONAL PARK BOUNDARY
- UNESCO OHRID ZONE
- PARK PRESPA BOUNDARY
- MUNICIPAL BORDER
- URBANIZATION
- EXISTING PAVED ROAD
- EXISTING MOUNTAIN ROAD
- HIKING TRAIL

NATIONAL PARK ZONING

- STRICT PROTECTION
- SUSTAINABLE USE
- ACTIVE MANAGEMENT
- BUFFER ZONE

Galičica National Park Boundary

Ohrid
Rača
Šipokno
Sv. Stefan
D. Konjsko
Lagadin
Elešec
LAKE OHRID
Peštani
Gradište
Trpejca
Ljubaništa
Sv. Naum
Sirhan
Oteshevo
LAKE PRESPA
Stenje
Republika Makedonija
Albania

Figure VI.5

NATIONAL PARK ZONING PLAN - UPDATE

GALIČICA
NATIONAL PARK

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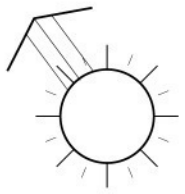
Contours: 25 Meters Date: 12/2013

Scale 1:80 000 (for A3 Printout)

0 800 1600 2400 3200 4000m

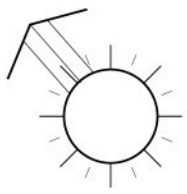
LEGEND

- DECEMBER 21
- JANUARY 21
- FEBRUARY 21



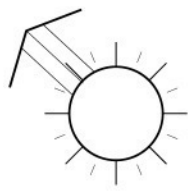
DEC 21 @ 09:00 hrs

Sun's Alt. = 16.3°
Sun's Az. = 143.3°
SUNRISE: 07:00 HRS
SUNSET: 16:10 HRS
MINUTES OF SUNSHINE: 550



JAN 21 @ 09:00 hrs

Sun's Alt. = 17.8°
Sun's Az. = 138.7°
SUNRISE: 06:58 HRS
SUNSET: 16:19 HRS
MINUTES OF SUNSHINE:561



FEB 21 @ 09:00 hrs

Sun's Alt. = 25.3
Sun's Az. = 132.7°
SUNRISE: 06:25 HRS
SUNSET: 17:17 HRS
MINUTES OF SUNSHINE: 652

LATITUDE = 41° 2.8' North
LONGITUDE = 20° 52.7' East
UTC +1 Hr

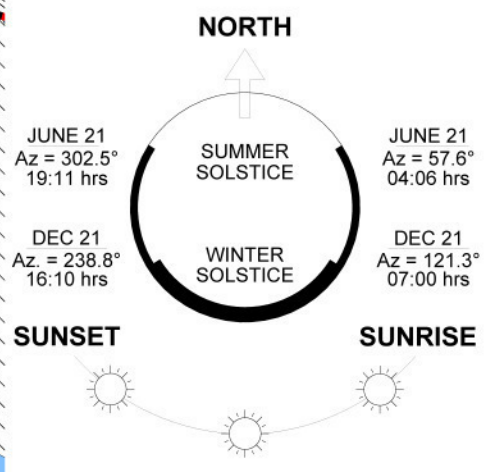


Figure VI.6A

SOLAR ANALYSIS 9 00 HRS - UPDATE

GALIČICA
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www.ecosign.com info@ecosign.com

N

Contours: 25 Meters Date: 12/2013

Scale 1:80 000 (for A3 Printout)

0 800 1600 2400 3200 4000m

LEGEND

- DECEMBER 21
- JANUARY 21
- FEBRUARY 21

Ohrid
Rača
Šipokno
Sv. Stefan
D. Konjsko
Lagadin
Elešec
LAKE OHRID
Peštani
Gradište
Trpejca
Ljubaništa
Galicica National Park Boundary
Burgarska 1801m
Presoka 1933m
Lift 2 (T-Bar
Tamoras 1673m
Lift 1 (2CLF
Cuculje 1508m
Kra Gola Buka 1980m
Lako Signoj 1934m
Megaro 2254m
Albania
Republic of Macedonia
LAKE PRESPA

DEC 21 @ 12:00 hrs
Sun's Alt. = 25.3
Sun's Az. = 186.4°
SUNRISE: 07:00 HRS
SUNSET: 16:10 HRS
MINUTES OF SUNSHINE: 550

JAN 21 @ 12:00 hrs
Sun's Alt. = 29.1°
Sun's Az. = 183.3°
SUNRISE: 06:58 HRS
SUNSET: 16:19 HRS
MINUTES OF SUNSHINE:561

FEB 21 @ 12:00 hrs
Sun's Alt. = 38.5°
Sun's Az. = 183.1°
SUNRISE: 06:25 HRS
SUNSET: 17:17 HRS
MINUTES OF SUNSHINE: 652

LATITUDE = 41° 2.8' North
LONGITUDE = 20° 52.7' East
UTC +1 Hr

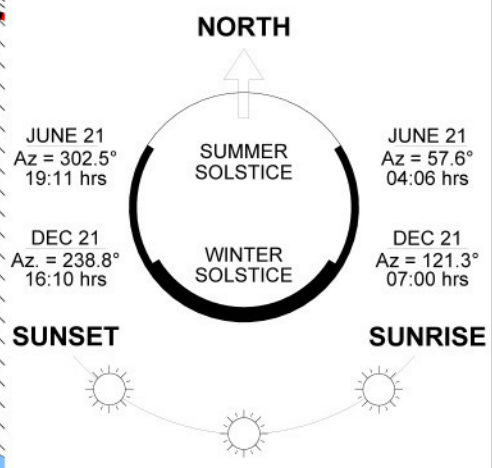

Figure VI.6B
SOLAR ANALYSIS 12 00 HRS - UPDATE

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NATIONAL PARK

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www.ecosign.com info@ecosign.com

N

Contours: 25 Meters Date: 12/2013

Scale 1:80 000 (for A3 Printout)

0 800 1600 2400 3200 4000m

LEGEND

- DECEMBER 21
- JANUARY 21
- FEBRUARY 21

Ohrid
Rača
Šipokno
Sv. Stefan
D. Konjsko
Lagadin
Elešec
LAKE OHRID
Peštani
Gradište
Trpejca
Ljubaništa
Galicica National Park Boundary
Burgerska 1301m
Presenka 1633m
Lift 2 / T-Bar
Tomoros 1673m
Lift 1 / 2CLF
Barrace 1924m
Kriš Gova Bukva 1985m
Dajgulje 1678m
Lake Sigrin 1984m
LAKE PRESPA
Republic of Macedonia
Albania
Megaro 2254m
Kota 2265m

DEC 21 @ 15:00 hrs
Sun's Alt. = 10.0°
Sun's Az. = 226.6°
SUNRISE: 07:00 HRS
SUNSET: 16:10 HRS
MINUTES OF SUNSHINE: 550

JAN 21 @ 15:00 hrs
Sun's Alt. = 14.7°
Sun's Az. = 226.3°
SUNRISE: 06:58 HRS
SUNSET: 16:19 HRS
MINUTES OF SUNSHINE:561

FEB 21 @ 15:00 hrs
Sun's Alt. = 22.6°
Sun's Az. = 231.7°
SUNRISE: 06:25 HRS
SUNSET: 17:17 HRS
MINUTES OF SUNSHINE: 652

LATITUDE = 41° 2.8' North
LONGITUDE = 20° 52.7' East
UTC +1 Hr

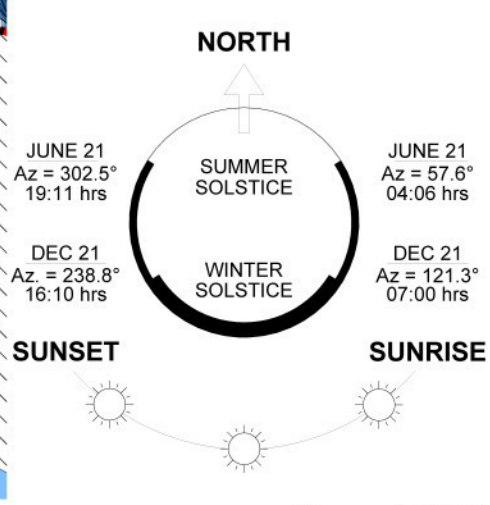

Figure VI.6C

SOLAR ANALYSIS 15 00 HRS - UPDATE

GALIČICA
NATIONAL PARK

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N

Contours: 20 Meters Date: 11/2013

Scale 1:80.000 (for A3 printout)

0 750 1.500 3.000 m

LEGEND

- EXISTING LIFT
- EXISTING PAVED ROAD
- EXISTING MOUNTAIN ROAD
- NATIONAL BORDER
- NATIONAL PARK BOUNDARY

SOLAR RADIATION

kWh/m²

- < 200
- 200 - 260
- 260 - 320
- 320 - 380
- 380 - 440
- 440 - 500
- 500 - 560
- 560 - 620
- 620 - 680
- > 680

* Notes:
Period of Calculation = Dec 1, 2012 - March 31, 2013
Number of Days Analyzed: 121 days
Daily Extents of Calculation = 03:00 hrs - 22:00 hrs
Interval of Calculation = 15 minutes

OHRID
Rača
Šipokno
Sv. Stefan
D. Konjsko
Lagadin
Elešec
Peštani
LAKE OHRID
Gradište
Trpejca
Ljubaništa
Lift 2 / T-Bar
2CLF
Oteshevo
LAKE PRESPA
Stenje
REPUBLIC OF MACEDONIA
ALBANIA

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Figure VI.7

INCOMING SOLAR RADIATION ANALYSIS - UPDATE

GALIČICA
NATIONAL PARK

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N

Contours: 20 Meters Date: 11/2013

Scale 1:80.000 (for A3 printout)

0 750 1.500 3.000 m

LEGEND

- LIFT OUT OF SERVICE
- NATIONAL BORDER
- EXISTING PAVED ROAD
- EXISTING MOUNTAIN ROAD
- NATIONAL PARK BOUNDARY

SLOPE [%]

- < 8
- 8 - 25
- 25 - 45
- 45 - 70
- > 70

SKI TERRAIN SUITABILITY

- IDEAL (NO SHADING)
- ACCEPTABLE
- POOR
- UNSUITABLE

OHRID
Rača
Šipokno
Sv. Stefan
D. Konjsko
Lagadin
Elešec
Peštani
LAKE OHRID
Gradište
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Ljubaništa
Oteshevo
LAKE PRESPA
Stenje
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ALBANIA

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Figure VI.8

SKI TERRAIN SUITABILITY ANALYSIS - UPDATE

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N

Contours: 10 Meters

Date: 12/2013

Scale 1:25.000 (for A3 printout)

0 250 500 1.000 m

LEGEND

- LIFT OUT OF SERVICE
- EXISTING PAVED ROAD
- EXISTING MOUNTAIN ROAD
- SKI TERRAIN POD

SLOPE [%]

- < 8
- 8 - 25
- 25 - 45
- 45 - 70
- > 70

SKI TERRAIN SUITABILITY

- IDEAL (NO SHADING)
- ACCEPTABLE
- POOR
- UNSUITABLE

NORTH ZONE

WEST ZONE

EAST ZONE

Figure VI.9a

TERRAIN CAPACITY ANALYSIS I - UPDATE

GALIČICA
NATIONAL PARK

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N

Contours: 10 Meters Date: 12/2013

Scale 1:25.000 (for A3 printout)

0 250 500 1.000 m

LEGEND

- LIFT OUT OF SERVICE
- EXISTING PAVED ROAD
- EXISTING MOUNTAIN ROAD
- NATIONAL BORDER
- SKI TERRAIN POD
- NATIONAL PARK BOUNDARY

SLOPE [%]

- < 8
- 8 - 25
- 25 - 45
- 45 - 70
- > 70

SKI TERRAIN SUITABILITY

- IDEAL (NO SHADING)
- ACCEPTABLE
- POOR
- UNSUITABLE

WEST ZONE

SOUTH ZONE

REPUBLIC OF MACEDONIA

ALBANIA

Figure VI.9b

TERRAIN CAPACITY ANALYSIS - UPDATE

GALIČICA
NATIONAL PARK

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N

Contours: 5 Meters

Date: 12/2013

Scale 1:30 000 (for A3 Printout)

0 300 600 900 1200 1500m

Area 6
Study Area North

Elešec

Peštani

Gradište

LO-1
4,6 ha

LO-2
22,4 ha

LO-3
2,7 ha

LO-4
21,0 ha

LO-5
24,4 ha

LO-6
2,2 ha

LO-7
5,0 ha

LO-8
36,8 ha

A
B
C
D
E
F
G
H

Area 1
Lake Ohrid

Area 5
West Plateau

WP-1
2,6 ha

WP-2
1,0 ha

Area 4
Central Plateau

CP-1
13,1 ha

CP-2
70,0 ha

CP-3
55,5 ha

Lift 1 | 2CLF

Lift 2 | 4 | 6

Area 3
Krle Gola Buka Summit

Area 2
Mt. Magaro

Bugarska
1901m

Cuguile
1528m

Krle Gola Buka
1985m

Lako Slignot
1984m

LEGEND

- URBANIZATION
- EXISTING PAVED ROAD
- EXISTING MOUNTAIN ROAD
- SKI TERRAIN POD
- **HIGH VALUE** POTENTIAL BASE AREA OR REAL ESTATE DEVELOPMENT
- **LOW VALUE** POTENTIAL BASE AREA OR REAL ESTATE DEVELOPMENT
- POTENTIAL ACCESS GONDOLA ALIGNMENT
- STAGING POINT / SKIER WALKING DISTANCE

BASE SLOPE ANALYSIS

- 0-8%
- 8-15%
- 15-25%
- 25-40%
- 40% +

Figure VI.10A

BASE AREA DEVELOPMENT SUITABILITY ANALYSIS - LAKE OHRID

GALIČICA
NATIONAL PARK

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N

Contours: 5 Meters Date: 12/2013

Scale 1:30 000 (for A3 Printout)

0 300 600 900 1200 1500m

Area 5
West Plateau

Area 4
Central Plateau

Area 6
Łake Prespa

Area 3
Krle Gola Buka Summit

Area 2
Mt. Magaro

Oteshevo

LAKE PRESPA

Stenje

Republic of Macedonia

Albania

Burgarska 1801m

Preseka 1633m

Krle Gola Buka 1985m

Čuguljе 1528m

Tomoros 1673m

WP-2
1,0 ha

WP-1
2,6 ha

CP-3
55,5 ha

CP-4
14,0 ha

CP-2
70,0 ha

CP-1
13,1 ha

LP-2
29,0 ha

LP-1
10,1 ha

F

G

H

Lift 1 / 2CLF

Lift 2 / 6

LEGEND

- URBANIZATION
- EXISTING PAVED ROAD
- EXISTING MOUNTAIN ROAD
- SKI TERRAIN POD
- **HIGH VALUE** POTENTIAL BASE AREA OR REAL ESTATE DEVELOPMENT
- **LOW VALUE** POTENTIAL BASE AREA OR REAL ESTATE DEVELOPMENT
- POTENTIAL ACCESS GONDOLA ALIGNMENT
- STAGING POINT / SKIER WALKING DISTANCE

BASE SLOPE ANALYSIS

- 0-8%
- 8-15%
- 15-25%
- 25-40%
- 40% +

Figure VI.10B

BASE AREA DEVELOPMENT SUITABILITY ANALYSIS - LAKE PRESPA

VI.2 DEVELOPMENT ANALYSIS – Step 3 Update

The Technical Assessment process involves identifying, analyzing and mapping physical characteristics within the study area that influence the feasibility and quality of potential four-season mountain resort development. The result of this stage in the planning process is a comprehensive assessment of all of the site's opportunities and constraints, from which conclusions on the best location and relative capacity of mountain resort development can be drawn. The analysis carried out in the Technical Assessment forms the foundation of the resort planning process and provides a scientific rationale for development recommendations that will be elaborated upon in future phases.

The purpose of the Development Analysis is to combine the site information and data gathered during the inventory stage with acceptable ski industry planning and design parameters. Specifically, the constraints imposed by climate, surface geology, topographic features, natural hazards, forest cover, existing development and solar exposure have influenced the opportunities and development potential of the study area.

.2.1 Mountain Planning Parameters and Design Objectives

In order to determine the potential for alpine skiing and the skier carrying capacity of the terrain within the Galičica study area, Ecosign has applied internationally recognized ski area planning parameters and ski business standards to the terrain analysis. Design Objectives and planning parameters for pistes, skier densities, skill class distribution are outlined below and provide a basis for the mountain planning methodology. .

Ski Pistes

Ski pistes are classified in concert with the International Ski Piste Standards (Table VI.1), as well as the seven skier skill classification levels exhibited in Table VI.2.

TABLE VI.1
INTERNATIONAL PISTE STANDARDS

PISTE DESIGNATION	SKIER ABILITY LEVELS
Easier	Beginner & Novice Skiers
More Difficult	Intermediate Skiers
Most Difficult	Advanced & Expert Skiers

TABLE VI.2
SKIER SKILL CLASSIFICATIONS

Skill Classifications		Acceptable Terrain Gradients	Maximum Gradient
1	Beginner	8 - 15%	20%
2	Novice	15 - 25%	30%
3	Low Intermediate	25 - 35%	40%
4	Intermediate	30 - 40%	45%
5	High Intermediate	35 - 45%	50%
6	Advanced	45 - 60%	65%
7	Expert	60% +	

Ski pistes are classified via an evaluation of the following parameters: slope width, average gradient and the steepest 30-meter vertical pitch. Since the average slope gradient of a ski piste is generally much lower than the steepest 30-meter vertical pitch, pistes are usually classified to ensure that the steepest 30-meter vertical pitch falls within five percent of the acceptable terrain gradients listed in Table VI.2. Furthermore, a gentle novice ski piste cannot suddenly turn into an advanced ski piste for obvious reasons. We have used the skill level classification system shown in the above table to rate the terrain within the Galičica study area.

Skier/Snowboarder Densities

Ecosign has performed on-site research to determine comfortable and safe skier densities at ski areas in many parts of the world. The research consisted of performing on-site guest surveys while simultaneously taking aerial photos of the pistes by helicopter. One of the questions on the survey asks skiers their subjective opinion of the crowding on the particular piste they skied. Their opinions were then compared with the actual densities recorded in the photos. From these comparisons, we estimated skier densities which provide skiers with a high quality, comfortable experience, resulting in good memories and the likelihood of return visits.

Densities used in planning ski areas in different parts of the world are listed in Table VI.3 and shown graphically in Plate VI.1. In areas such as Europe, western Canada and the western United States, skier densities are relatively low compared to the densities at ski areas in Japan or Australia, where skiers have been historically conditioned to higher densities. For example, densities in Japan are generally three times of those in western North American destination resorts. Listed in Table VI.3 are the “SAOT” (Skiers At One Time) and the “On-Slope” densities. The SAOT is based on the total number of skiers/snowboarders at the area, including those in lift queues, riding lifts, in restaurants and on the pistes. The “On-Slope” densities take into account only those skiers and snowboarders actually on the pistes at any given time.

TABLE VI.3
WORLDWIDE COMPARISON OF PISTE DENSITIES

Skill Classification	1 Beginner	2 Novice	3 Low Inter.	4 Inter-mediate	5 High Inter.	6 Advanced	7 Expert
Western North America Destination							
SAOT	50	50	40	40	30	15	20
On-Slope	20	20	15	15	12	7	10
European Destination							
SAOT	75	75	60	60	45	23	30
On-Slope	30	30	23	23	18	10	15
Australia							
SAOT	135	100	80	80	60	30	40
On-Slope	54	40	30	30	24	14	20
Japan							
SAOT	156	156	125	125	97	55	70
On-Slope	62	62	47	47	39	26	35
Eastern North America (Farwell High Standard)							
SAOT	250	150	125	86	50	37	37
On-Slope	110	66	55	37	22	16	16

Note: All of the above densities are in skiers per Hectare

WORLDWIDE SKIER DENSITIES

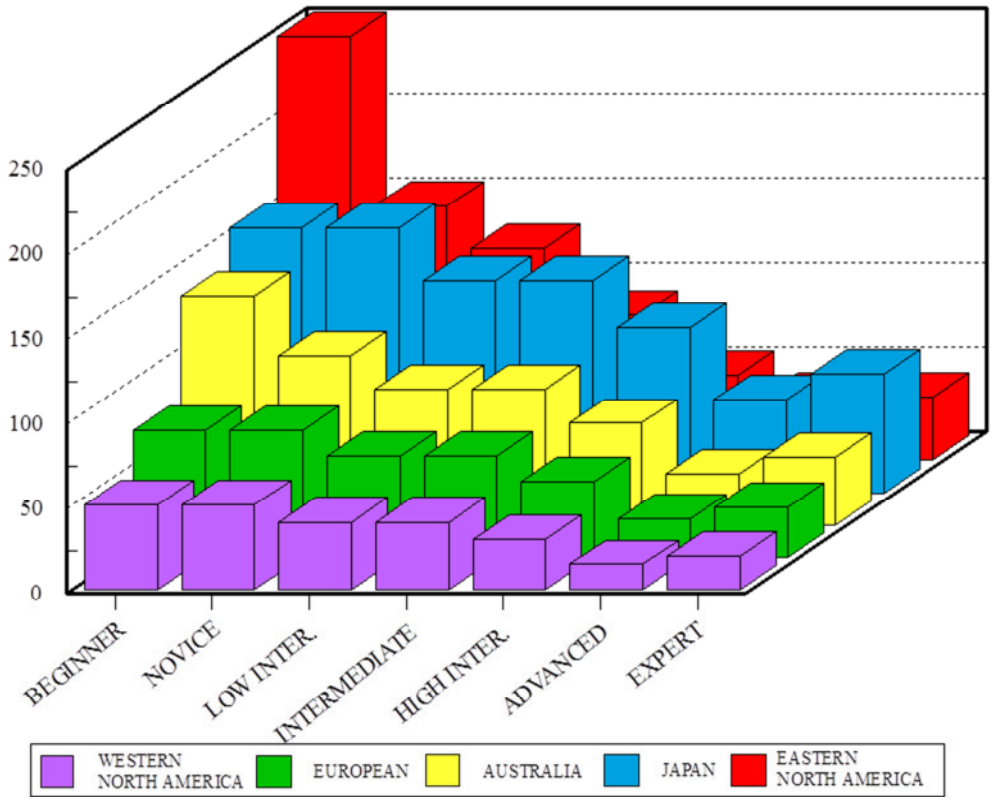


PLATE VI.1

As shown in Table VI.3, acceptable skier/snowboarder slope densities tend to decrease as the proficiency of the skier increases. The lower density for better skiers occurs due to their increased speed, and therefore, longer stopping distances and the general increase in space needed to avoid obstacles and other skiers. As listed, the exception to this rule is that slope densities increase slightly on expert terrain since these steep, un-groomed slopes dictate controlled, short radius turns. Under these conditions, expert skiers have slower speeds and require less space for safe skiing. Large, expansive "free skiing" areas are calculated at 1/5 slope density because these areas are unprepared, and typically only support a fraction of the skier densities listed above.

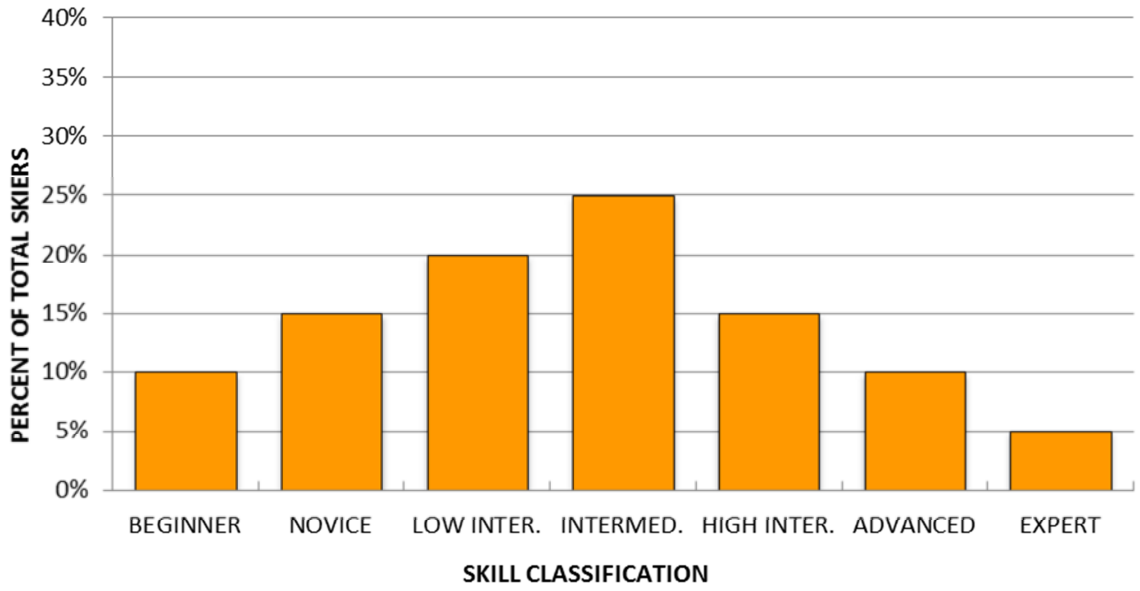
Based on our experience in the Republic of Macedonia and numerous winter site inspections in the surrounding regions, Ecosign feels that the European densities, as exhibited in Table VI.3, are appropriate for use in determining the potential terrain carrying capacity of the ski pistes at Galičica. The densities shown will be used both in the evaluation of the existing and proposed piste capacities and the potential terrain carrying capacity of any additional slopes adjacent to the presently developed area.

Winter photo of the highest mountains within the Galičica National Park.

Skier Skill Class Distribution

During the past several years, Ecosign has undertaken and reviewed substantial research dealing with skiing demand, skier skill class distribution and skier densities on a worldwide basis. This research and observation of the worldwide skiing/snowboarding population, suggests that the total worldwide market would conform to a bell curve distribution of skier skill levels. Plate VI.2 illustrates the normal "Bell Shape" distribution used for planning purposes.

SKIER SKILL CLASS DISTRIBUTION
PLATE VI.2



Generally, an important part of the analysis of a ski area is the comparison of the variety of ski terrain by the skier skill class with the target skier market. To accurately portray the terrain balance of the ski terrain, we computed the terrain available to each of the seven skier skill classifications and then multiplied by the appropriate skier densities to illustrate the distribution of the skiing terrain available to each skier skill level. This calculation is often referred to as "area balancing" and provides the planning team with the data necessary to compare the mountain piste development potential with the apparent proportions of the skier market, as shown in Plate VI.2.

Skier Carrying Capacity (SCC)

The determination of an area's Skier Carrying Capacity (SCC) is perhaps the most critical step in ski area planning. Often referred to as the "comfortable carrying capacity" or the "skiers at one time" (SAOT), this figure represents the number of skiers that can be safely supported by an area's lift and ski piste system at a snapshot in time, while providing a quality experience to each skier's ability level. The skier carrying capacity is determined via the integration of lift capacity, acceptable ski piste densities, slope gradients, skier skill classifications and vertical meters of lift serviced terrain. These factors produce two of the three most important factors in the calculation of each lift's SAOT, the total daily Vertical Transport Meters (VTM) supplied by each lift and the VTM demanded by each skier on that particular lift. The third factor, "access reduction" takes into account the reduction of a lift's effective capacity due to its partial function as a transport lift, particularly during the morning staging period. During a portion of the day, a lift may be used exclusively for transport and therefore, not available for return cycle skiing.

Ecosign's experience is that on average, skiers will ski between 5 and 6 hours a day, depending on their skill class. Skiers in skill classes 1-5 will ski approximately 5 hours per day, while those in classes 6 and 7 will ski about 6 hours per day.

Each skier ability level places different demands upon an area's lift and piste system. Empirical observations have determined that each skier ability level will ski a relatively constant number of vertical meters per day. As the proficiency of the skier increases, the demand for vertical meters also increases. During the past several years, Ecosign has undertaken and reviewed substantial research dealing with skier demand, skier skill distribution and skier densities. These reviews have continued to support the ranges of vertical demand for each skier/boarder skill class, as shown in Table VI.4.

TABLE VI.4
SKIING DEMAND BY SKILL CLASSIFICATION

Skill Classification	Planning Goals	Skier Demand VTM/Day		
		Low	Average	High
1 Beginner	10%	610	705	940
2 Novice	15%	1.370	1.595	2.120
3 Low Intermediate	20%	1.830	2.125	2.825
4 Intermediate	25%	2.440	2.830	3.770
5 High Intermediate	15%	3.290	3.840	5.085
6 Advanced	10%	3.840	4.460	5.935
7 Expert	5%	5.485	6.370	8.475
Weighted Average		**2.394**	**2.783**	**3.700**

Based on five hours skiing for skill classes 1 to 5 and six hours skiing for skill classes 6 and 7.

In Central Europe, western Canada and the western United States, we use the industry high VTM demand to ensure a quality, un-crowded skiing experience for the better conditioned, more aggressive skiers. In urban markets and the emerging markets we select the average levels of demand for use in planning. We believe that the skier market in Galičica falls into the average demand category.

Summary of the Galičica Study Area Planning Parameters

The planning parameters used for the analysis of the terrain (in this section of the report) and in the planning of the ski area (in later sections) for the Galičica study area are listed in Table VI.5.

TABLE VI.5
GALIČICA PLANNING PARAMETERS

Skill Classification	Skill Mix [%]	Acceptable Terrain Gradients	Skier Demand [VTM / Day]	Skier Densities [Skiers per ha] At Area	On Piste
1 Beginner	10%	8 - 15%	705	75	30
2 Novice	15%	15 - 25%	1.595	75	30
3 Low Intermediate	20%	25 - 35%	2.125	60	23
4 Intermediate	25%	30 - 40%	2.830	60	23
5 High Intermediate	15%	35 - 45%	3.840	45	18
6 Advanced	10%	45 - 60%	4.460	22,5	10
7 Expert	5%	60% +	6.370	30	15

.2.2 Mountain Design Analysis

Due to the complex terrain within the Study Area and in order to clearly illustrate the areas most suitable for downhill alpine skiing, we have prepared the "Ski Terrain Suitability Analysis" (Figure VI.8). In addition to illustrating the slope analysis, which identifies slope gradients suitable for downhill skiing, we have combined and overlaid the elevation and the incoming solar radiation analysis data in greyscale. Areas unsuitable for skiing due to elevation or incoming solar radiation are illustrated in varying shades of grey, while suitable areas are illustrated in full color.

Terrain below 1.500 meters elevation is shown in grey and areas that receive greater than 500 KWh/m^2 of incoming solar are also shown in grey shades. For example, south facing terrain located at 1.200 meters elevation is shown as a very dark shade of grey (completely unsuitable for skiing), while gently sloping terrain located at 1.600 meters elevation is either not shaded at all or shown in light grey (suitable for skiing, but depending on the amount of incoming solar radiation not as ideal as similar terrain facing north at the same elevation).

.2.3 Terrain Capacity Analysis (TCA).

We have analyzed the natural terrain within the entire study area which possesses good ski potential to accurately establish the area's overall ski development potential. The Terrain Capacity Analysis shown on Figure VI.9a and Figure VI.9b graphically illustrates major terrain pods within the study area which possess good potential for ski development. The pods were selected by consulting the results of previously mentioned terrain analysis methods, the Mountain Slope Analysis Map (Figure VI.3) and the Terrain Suitability Map (Figures VI.8), while observing the following criteria:

- Continuous fall line skiing from top to bottom

- Suitable upper and lower lift terminal locations (e.g., 0,2 hectares less than 25% slope)
- Good slope continuity to allow interesting skiing from top to bottom for one or more skier ability levels
- Natural slope gradients primarily greater than 8% and less than 70%.

Within each terrain pod, the upper and lower points are joined to establish the total vertical rise, horizontal distance, straight line slope and steepest 30-meter vertical pitch. The total pod area is calculated and major unskiable areas (slopes greater than 70%, local knolls, etc.) subtracted. The above data comprises the inputs to our ski terrain capacity computer program. The final program input is a judgment which identifies the "primary" skier skill classification for each terrain pod. The program outputs are as follows:

SKI TERRAIN – net developable ski terrain within the pod. The amount or percent of ski piste development within each pod varies depending upon actual developed areas, general topography, etc. We generally use a figure ranging from 30 to 50% development for ski slopes on open terrain. Terrain pods which contain significant amounts of steep un-skiable terrain, or terrain with unfavorable southern aspects will have lower net developable ski terrain. Finally, very small beginner/novice pods located in areas cleared of trees have a potential for more development, and have therefore been calculated with 50% net developable area.

TOTAL SKIERS – in pod at acceptable skier densities.

DEMAND VTM (000) – vertical transport meters required to service the total skiers.

LIFT CAPACITY/HR. – the net hourly lift capacity necessary to maximize the development of each pod.

The Terrain Capacity Analysis (Figures VI.9a+b) and program printouts provide a reliable indication of the maximum development potential of each pod and the lift capacity necessary to balance with the terrain.

Ecosign has identified a total of 57 ski pods within the study area, which have a potential of a total capacity of approximately 10.760 skiers per day. The identified pods were classified into 4 major groups based on the locations of identified areas:

North Zone

- The ski pods of the North Zone are predominantly north-facing and are characterized by great ski terrain mainly for intermediate and low intermediate skiers. The accessibility of the pods is relatively challenging,

as they are located in the centre of the National Park and there is no existing road leading to the pods. The ski potential of the North Zone is limited to 180m of vertical. The ski terrain within this zone has a potential development capacity of about 1.200 skiers.

East Zone

- The 4 identified pods of the East Zone are located at the west-facing slopes of Mt. Tamoros at elevations between 1.435 and 1.670m. The identified terrain suitable for skiing only offers terrain for intermediate and high intermediate skiers. Thus there is a lack of terrain for beginners to low intermediate skiers and for advanced to expert skiers. Hence, it will not be possible to build a well-balanced ski area in this zone. The overall development of this zone is approximately 1.170 skiers.

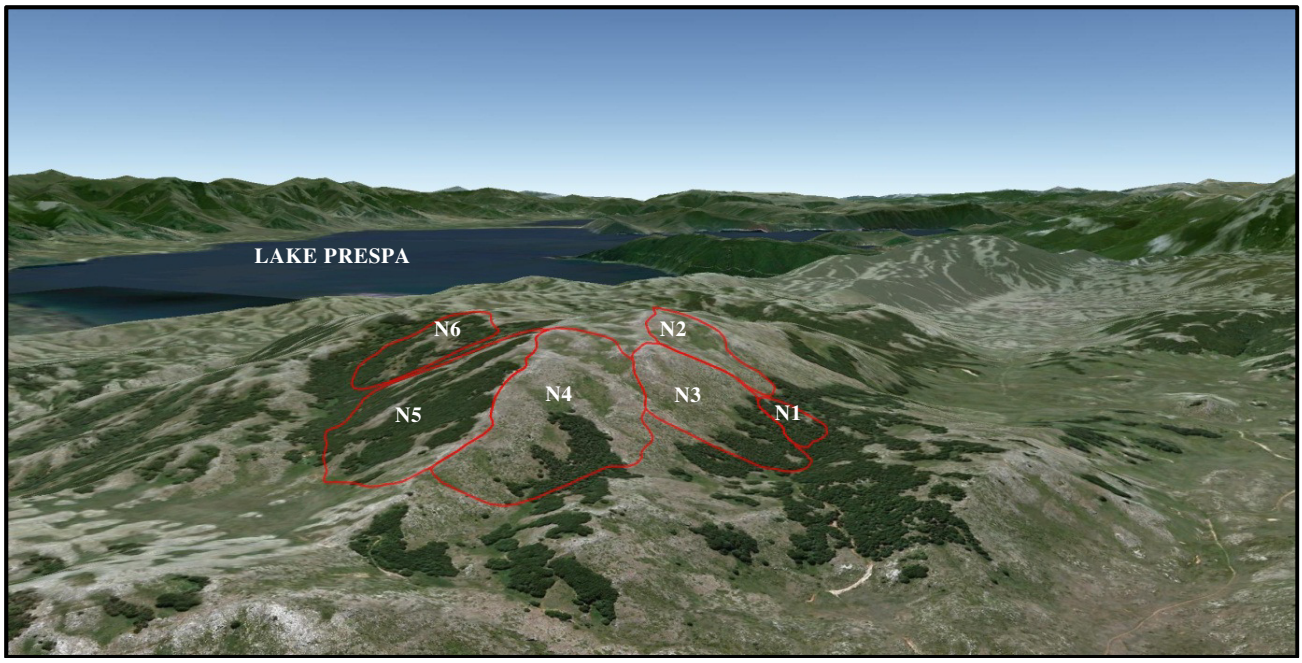
South Zone

- We have identified 22 ski pods with potential for alpine skiing within the South Zone. With the lowest point at 1.520m and the highest point at 2.250 meters elevation, this zone offers the most vertical of the 4 identified areas. The pods have a great aspect and could be accessed from the existing pass road. The entire South Zone is located within the area of strict protection. Therefore any developments within this area would be difficult and problematic from an environmental point of view. The ski terrain of the South Zone has a potential development capacity of about 3.650.

West Zone

The 25 potential ski pods within the West Zone are predominantly characterized by east and west-facing slopes. With an overall capacity of approximately 4.740 skiers, this area has the greatest potential skier capacity out of the four identified Zones. The terrain offers approximately 400m of vertical, starting at 1.500 meters elevation and the highest point located at almost 1.900m. The ski zone could be accessed either directly from Lake Ohrid via a lift system or by utilizing the existing pass road.

The detailed specifications of the identified terrain pods and a summary of the characteristics of each of the four studied zones are provided below in Table VI.6 to VI.13.



Overview of the identified ski pods at the North Zone

TABLE VI.6
TERRAIN CAPACITY ANALYSIS
GALIČICA – NORTH ZONE

Terrain Pod	Top Elevation (m)	Bottom Elevation (m)	Total Vertical (m)	Horizontal Distance (m)	SlopeDistance (m)	Average Slope (%)	Max. 30 m. Slope (%)	Skill Class	Skier Density / ha	VTM Demand / Day	Total Area (ha)	Unusable Terrain	% Ski Terrain Available	Available Ski Terrain (ha)	**Total Skiers**	Demand VTM (000)	Lift Capacity / hr
N1	1.595	1.550	45	230	234	20	21	2	75	1.595	1,80	0,0	60	1,1	**80**	20	450
N2	1.730	1.595	135	425	446	32	42	4	60	2.830	6,40	0,0	35	2,2	**130**	58	433
N3	1.700	1.520	180	490	522	37	52	6	22,5	4.460	10,00	0,0	30	3,0	**70**	50	275
N4	1.715	1.570	145	620	637	23	35	3	60	2.125	17,60	0,0	35	6,2	**370**	125	861
N5	1.715	1.550	165	700	719	24	43	4	60	2.830	19,60	0,0	30	5,9	**350**	157	953
N6	1.710	1.600	110	485	497	23	31	3	60	2.125	9,60	0,0	35	3,4	**200**	67	613
TOTAL			**780**		**3.056**						**65,0**			**21,7**	**1.200**		**3.585**

Table VI.7 lists the balance of the skier skill classes as compared to the anticipated skier market and Plate VI.3 illustrates the terrain pod balance for the North Zone.

TABLE VI.7
TERRAIN POD BALANCE
GALIČICA – NORTH ZONE

Skill Classification	Hectares	Skiers	Percentage	Ideal
1 Beginner	0,0	0	0%	10%
2 Novice	1,1	80	7%	15%
3 Low Intermediate	9,5	570	47%	20%
4 Intermediate	8,1	480	40%	25%
5 High Intermediate	0,0	0	0%	15%
6 Advanced	3,0	70	6%	10%
7 Expert	0,0	0	0%	5%
Total	**21,7**	**1.200**	**100%**	**100%**

Optimum Density =	58,8	Skiers/Hectare
Weighted Demand =	2.508	VTM/Skier/Day

TERRAIN POD BALANCE
GALIČICA – NORTH ZONE

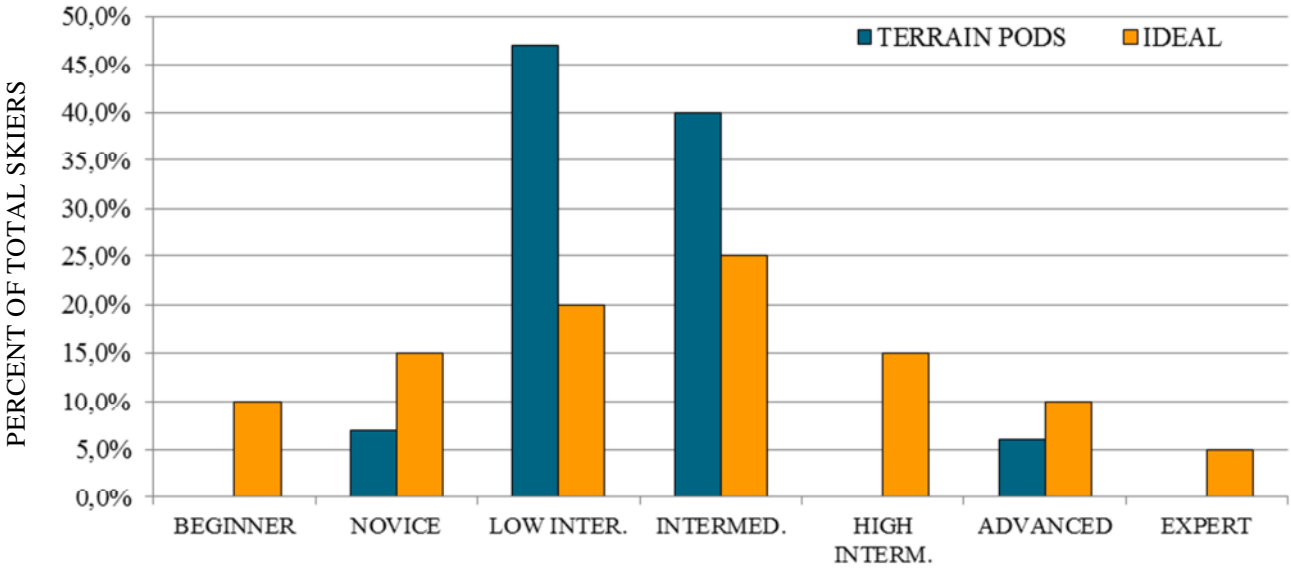
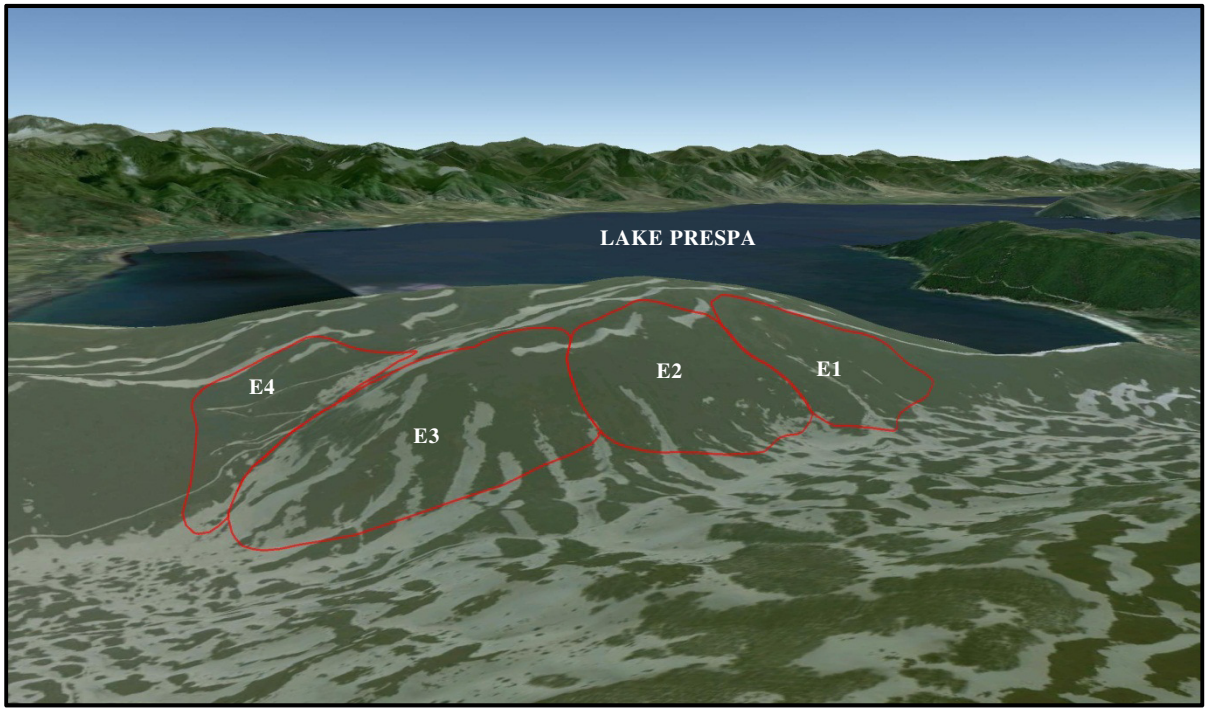


PLATE VI.3

As shown in Plate VI.3, the terrain distribution is out of balance with an excess of low intermediate and intermediate terrain. The identified pods do not feature any terrain for beginners, high intermediate or expert skiers and there is a lack of terrain for novice and advanced skiers. The overall terrain distribution indicates that this area has some good potential for alpine skiing but also some limitations in scope and skill class distribution. If all potential terrain pods were developed according to the plans, the total potential terrain capacity of these 6 pods would be approximately 1.200 skiers per day.

East Zone



View towards Mt. Tomoros with the 4 identified ski pods of the East Zone

TABLE VI.8
TERRAIN CAPACITY ANALYSIS
GALIČICA – EAST ZONE

Terrain Pod	Top Elevation (m)	Bottom Elevation (m)	Total Vertical (m)	Horizontal Distance (m)	SlopeDistance (m)	Average Slope (%)	Max. 30 m. Slope (%)	Skill Class	Skier Density / ha	VTM Demand / Day	Total Area (ha)	Unusable Terrain	% Ski Terrain Available	Available Ski Terrain (ha)	Total Skiers	Demand VTM (000)	Lift Capacity / hr
E1	1.670	1.490	180	510	541	35	43	4	60	2.830	12,30	0,0	30	3,7	**220**	99	549
E2	1.660	1.485	175	510	539	34	50	5	45	3.840	16,70	0,0	35	5,8	**260**	158	906
E3	1.630	1.435	195	725	751	27	45	4	60	2.830	22,80	0,0	35	8,0	**480**	216	1.106
E4	1.605	1.435	170	605	628	28	42	4	60	2.830	9,90	0,0	35	3,5	**210**	94	555
TOTAL			**720**		**2.459**						**61,7**			**21,0**	**1.170**		**3.115**

Table VI.9 lists the balance of the skier skill classes as compared to the anticipated skier market for the Galičica – East Zone and Plate III.4 graphically illustrates the balance.

TABLE VI.9
TERRAIN POD BALANCE
GALIČICA – EAST ZONE

Skill Classification	Hectares	Skiers	Percentage	Ideal
1 Beginner	0,0	0	0%	10%
2 Novice	0,0	0	0%	15%
3 Low Intermediate	0,0	0	0%	20%
4 Intermediate	15,1	910	78%	25%
5 High Intermediate	5,8	260	22%	15%
6 Advanced	0,0	0	0%	10%
7 Expert	0,0	0	0%	5%
Total	**21,0**	**1.170**	**100%**	**100%**

Optimum Density =	56,7	Skiers/Hectare
Weighted Demand =	3.054	VTM/Skier/Day

TERRAIN POD BALANCE
GALIČICA – EAST ZONE

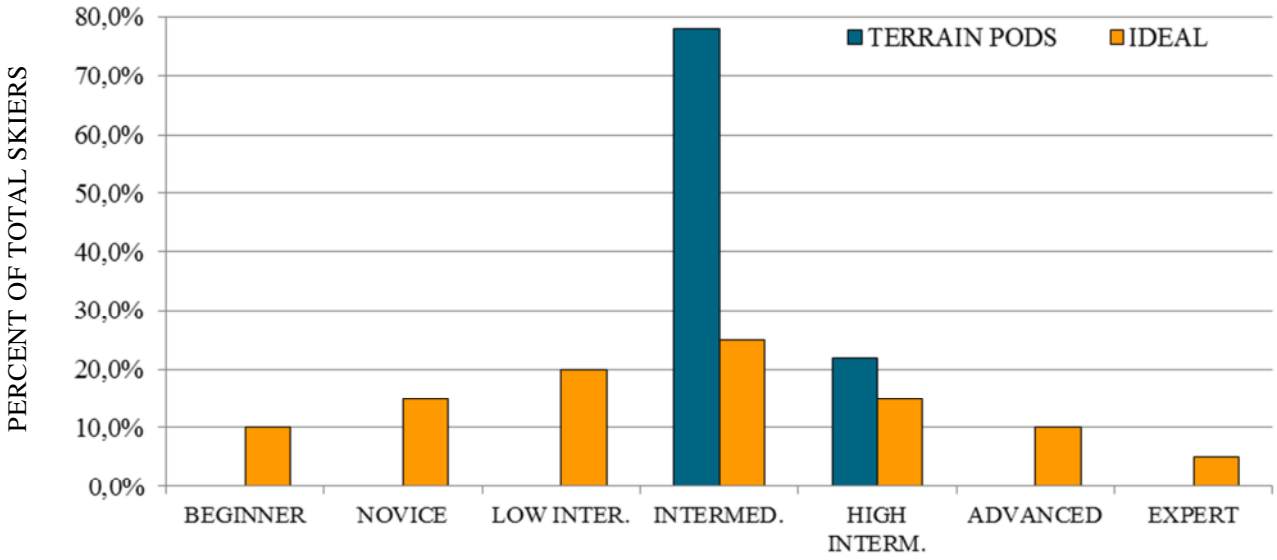
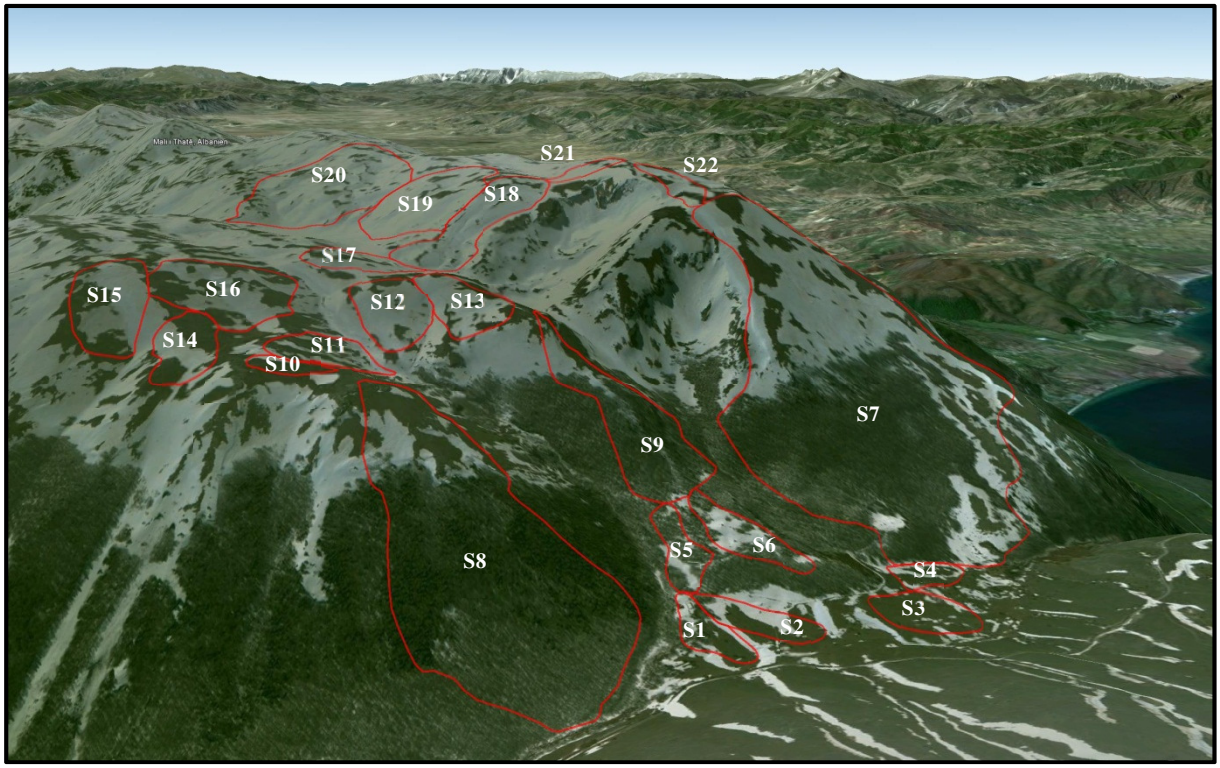


PLATE VI.4

The terrain distribution shows that the East Zone is characterized by a remarkable surplus of intermediate skill class terrain and absence of beginner to low intermediate, and advanced to expert terrain. The latter will make it difficult to develop properly balanced ski area. The total potential capacity of this study area could be approximately 1.170 skiers.

South Zone



Overview of the identified ski pods in the South Zone.

TABLE VI.10
TERRAIN CAPACITY ANALYSIS
GALIČICA – SOUTH ZONE

Terrain Pod	Top Elevation (m)	Bottom Elevation (m)	Total Vertical (m)	Horizontal Distance (m)	SlopeDistance (m)	Average Slope (%)	Max. 30 m. Slope (%)	Skill Class	Skier Density / ha	VTM Demand / Day	Total Area (ha)	Unusable Terrain	% Ski Terrain Available	Available Ski Terrain (ha)	**Total Skiers**	Demand VTM (000)	Lift Capacity / hr
S1	1.605	1.565	40	250	253	16	18	1	75	705	1,80	0,0	70	1,3	**90**	10	252
S2	1.605	1.560	45	300	303	15	19	1	75	705	2,30	0,0	70	1,6	**120**	13	298
S3	1.575	1.540	35	260	262	13	13	1	75	705	3,50	0,0	70	2,5	**180**	20	576
S4	1.570	1.535	35	220	223	16	16	1	75	705	1,70	0,0	60	1,0	**80**	9	256
S5	1.675	1.605	70	290	298	24	37	3	60	2.125	2,10	0,0	40	0,8	**50**	17	241
S6	1.695	1.620	75	360	368	21	25	2	75	1.595	3,40	0,0	50	1,7	**130**	33	439
S7	2.180	1.520	660	1.430	1.575	46	54	6	22,5	4.460	100,50	0,0	25	25,1	**570**	404	611
S8	1.955	1.520	435	865	968	50	55	6	22,5	4.460	27,20	0,0	30	8,2	**180**	127	293
S9	2.000	1.675	325	670	745	49	63	6	22,5	4.460	10,50	0,0	30	3,2	**70**	50	152
S10	1.980	1.955	25	215	216	12	17	1	75	705	1,60	0,0	60	1,0	**70**	8	313
S11	1.995	1.880	115	290	312	40	50	5	45	3.840	5,70	0,0	30	1,7	**80**	49	424
S12	2.035	1.925	110	350	367	31	43	4	60	2.830	6,10	0,0	35	2,1	**130**	58	531
S13	2.035	1940	95	400	411	24	41	4	60	2.830	6,80	0,0	35	2,4	**140**	63	662
S14	2.025	1.935	90	350	361	26	45	4	60	2.830	4,70	0,0	30	1,4	**80**	36	399
S15	2.110	1.955	155	450	476	34	42	4	60	2.830	7,30	0,0	35	2,6	**150**	67	435
S16	2.100	1.985	115	440	455	26	39	3	60	2.125	11,60	0,0	40	4,6	**280**	94	821
S17	2.080	1.995	85	345	355	25	33	3	60	2.125	8,20	0,0	35	2,9	**170**	57	675
S18	2.210	1.990	220	700	734	31	52	6	22,5	4.460	14,90	0,0	30	4,5	**100**	71	322
S19	2.210	2.025	185	630	657	29	57	6	22,5	4.460	23,80	0,0	30	7,1	**160**	113	612
S20	2.255	2.030	225	840	870	27	49	5	45	3.840	42,70	0,0	30	12,8	**580**	354	1.571
S21	2.250	2.180	70	320	328	22	38	3	60	2.125	4,00	0,0	35	1,4	**80**	27	385
S22	2.245	2.160	85	540	547	16	31	3	60	2.125	5,40	0,0	50	2,7	**160**	54	635
TOTAL			**3.295**		**11.084**						**295,8**			**92,5**	**3.650**		**10.904**

Table VI.11 lists the balance of the skier skill classes as compared to the anticipated skier market and Plate VI.5 illustrates the terrain pod balance for the South Zone.

TABLE VI.11
TERRAIN POD BALANCE
GALIČICA – SOUTH ZONE

Skill Classification	Hectares	Skiers	Percentage	Ideal
1 Beginner	7,3	540	15%	10%
2 Novice	1,7	130	4%	15%
3 Low Intermediate	12,5	740	20%	20%
4 Intermediate	8,5	500	14%	25%
5 High Intermediate	14,5	660	18%	15%
6 Advanced	48,0	1.080	29%	10%
7 Expert	0,0	0	0%	5%
Total	**92,5**	**3.650**	**100%**	**100%**

Optimum Density =	48,9	Skiers/Hectare
Weighted Demand =	2.994	

TERRAIN POD BALANCE
GALIČICA – SOUTH ZONE

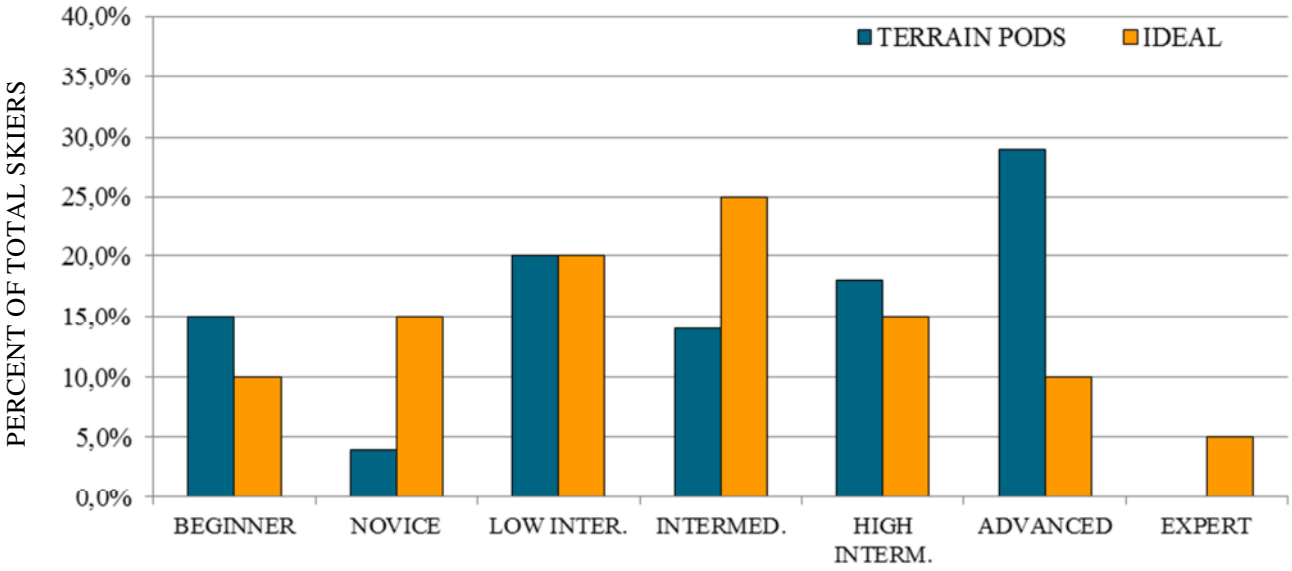
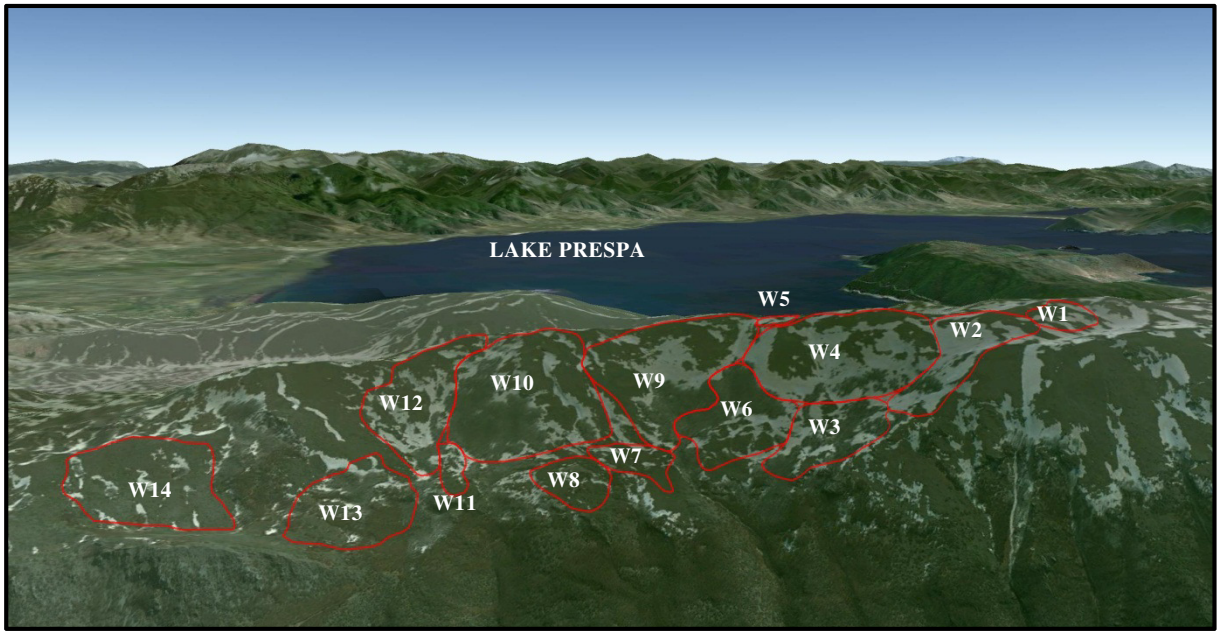
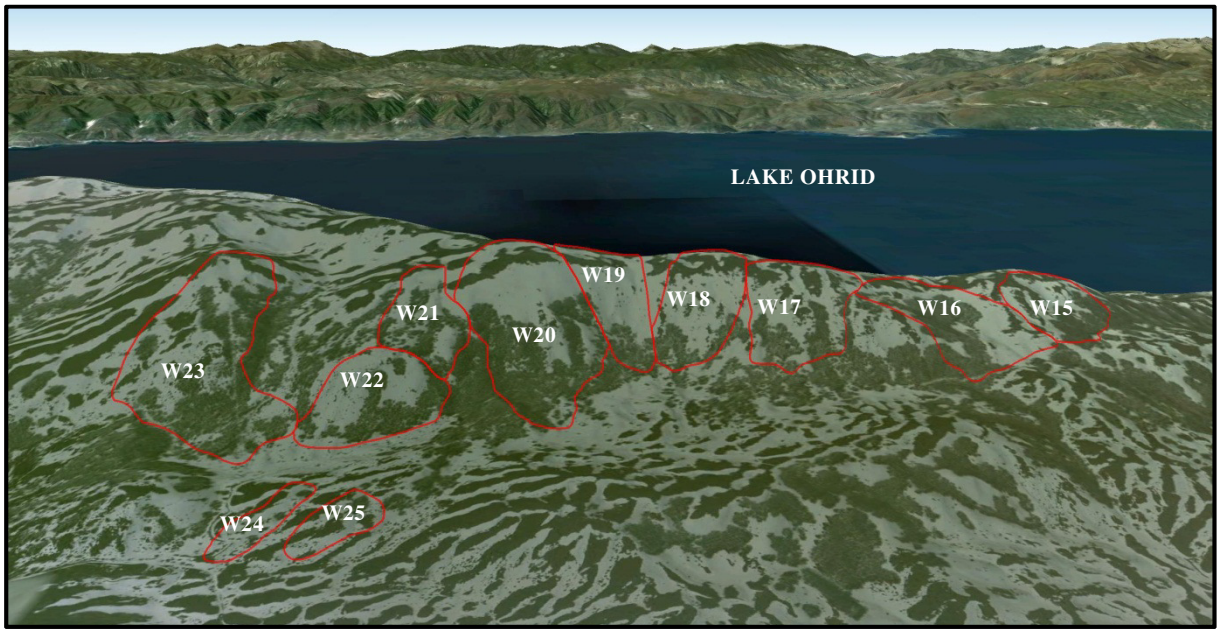


PLATE VI.5

As shown in Plate VI.5, the terrain distribution shows a great variety, with an excess of advanced, high intermediate and beginner terrain. There is a lack of novice, intermediate and expert skill class terrain within this area. If all potential terrain pods were developed according to the plans, the area would have a total capacity of approximately 3.650 skiers.



Overview of the west-facing ski pods in the West Zone



Overview of the east-facing ski pods in the West Zone

TABLE VI.12
TERRAIN CAPACITY ANALYSIS
GALIČICA – WEST ZONE

Terrain Pod	Top Elevation (m)	Bottom Elevation (m)	Total Vertical (m)	Horizontal Distance (m)	SlopeDistance (m)	Average Slope (%)	Max. 30 m. Slope (%)	Skill Class	Skier Density / ha	VTM Demand / Day	Total Area (ha)	Unusable Terrain	% Ski Terrain Available	Available Ski Terrain (ha)	**Total Skiers**	Demand VTM (000)	Lift Capacity / hr
W1	1.970	1.890	80	285	296	28	35	3	60	2.125	5,00	0,0	35	1,8	**110**	37	464
W2	1.940	1.695	245	710	751	35	48	5	45	3.840	17,20	0,0	35	6,0	**270**	165	672
W3	1.710	1.555	155	505	528	31	42	4	60	2.830	11,70	0,0	35	4,1	**250**	112	725
W4	1.930	1.690	240	615	660	39	57	6	22,5	4.460	32,60	0,0	30	9,8	**220**	156	649
W5	1.900	1.870	30	180	182	17	17	1	75	705	1,40	0,0	60	0,8	**60**	7	224
W6	1.765	1.565	200	615	647	33	39	3	60	2.125	15,30	0,0	35	5,4	**320**	108	540
W7	1.600	1.545	55	325	330	17	19	1	75	705	5,20	0,0	60	3,1	**230**	26	468
W8	1.585	1.515	70	275	284	25	35	3	60	2.125	5,30	0,0	50	2,7	**160**	54	771
W9	1.895	1.580	315	950	1.001	33	48	5	45	3.840	32,10	0,0	30	9,6	**430**	262	832
W10	1.870	1.570	300	740	798	41	52	6	22,5	4.460	33,70	0,0	30	10,1	**230**	163	543
W11	1.590	1.535	55	340	344	16	23	2	75	1.595	2,60	0,0	80	2,1	**160**	41	737
W12	1.845	1.535	310	920	971	34	56	6	22,5	4.460	18,20	0,0	35	6,4	**140**	99	320
W13	1.585	1.445	140	475	495	29	43	4	60	2.830	13,40	0,0	35	4,7	**280**	126	898
W14	1.660	1.470	190	590	620	32	46	5	45	3.840	17,70	0,0	30	5,3	**240**	146	770
W15	1.795	1.640	155	385	415	40	60	6	22,5	4.460	12,20	0,0	30	3,7	**80**	57	365
W16	1.790	1.600	190	630	658	30	48	5	45	3.840	20,10	0,0	30	6,0	**270**	165	866
W17	1.845	1.630	215	550	591	39	52	6	22,5	4.460	16,70	0,0	25	4,2	**90**	64	296
W18	1.870	1.615	255	600	652	43	58	6	22,5	4.460	13,90	0,0	30	4,2	**90**	64	250
W19	1.885	1.620	265	655	707	40	58	6	22,5	4.460	12,90	0,0	30	3,9	**90**	64	240
W20	1.895	1.580	315	985	1.034	32	55	6	22,5	4.460	31,30	0,0	35	11,0	**250**	177	562
W21	1.850	1.655	195	570	602	34	43	4	60	2.830	10,60	0,0	35	3,7	**220**	99	507
W22	1.715	1.550	165	370	405	45	55	6	22,5	4.460	11,30	0,0	30	3,4	**80**	57	343
W23	1.885	1.545	340	980	1.037	35	58	6	22,5	4.460	29,80	0,0	25	7,5	**170**	120	354
W24	1.555	1.500	55	320	325	17	25	2	75	1.595	3,20	0,0	60	1,9	**140**	35	644
W25	1.555	1.500	55	280	285	20	21	2	75	1.595	3,50	0,0	60	2,1	**160**	41	737
TOTAL			**4.590**		**14.619**						**376,9**			**123,2**	**4.740**		**13.776**

Table VI.13 lists the balance of the skier skill classes as compared to the anticipated skier market and Plate VI.6 illustrates the terrain pod balance for the West Zone.

TABLE VI.13
TERRAIN POD BALANCE
GALIČICA – WEST ZONE

Skill Classification	Hectares	Skiers	Percentage	Ideal
1 Beginner	4,0	290	6%	10%
2 Novice	6,1	460	10%	15%
3 Low Intermediate	9,8	590	12%	20%
4 Intermediate	12,5	750	16%	25%
5 High Intermediate	27,0	1.210	26%	15%
6 Advanced	63,9	1.440	30%	10%
7 Expert	0,0	0	0%	5%
Total	**123,2**	**4.740**	**100%**	**100%**

Optimum Density =	47,2	Skiers/Hectare
Weighted Demand =	3.245	VTM/Skier/Day

TERRAIN POD BALANCE
GALIČICA – WEST ZONE

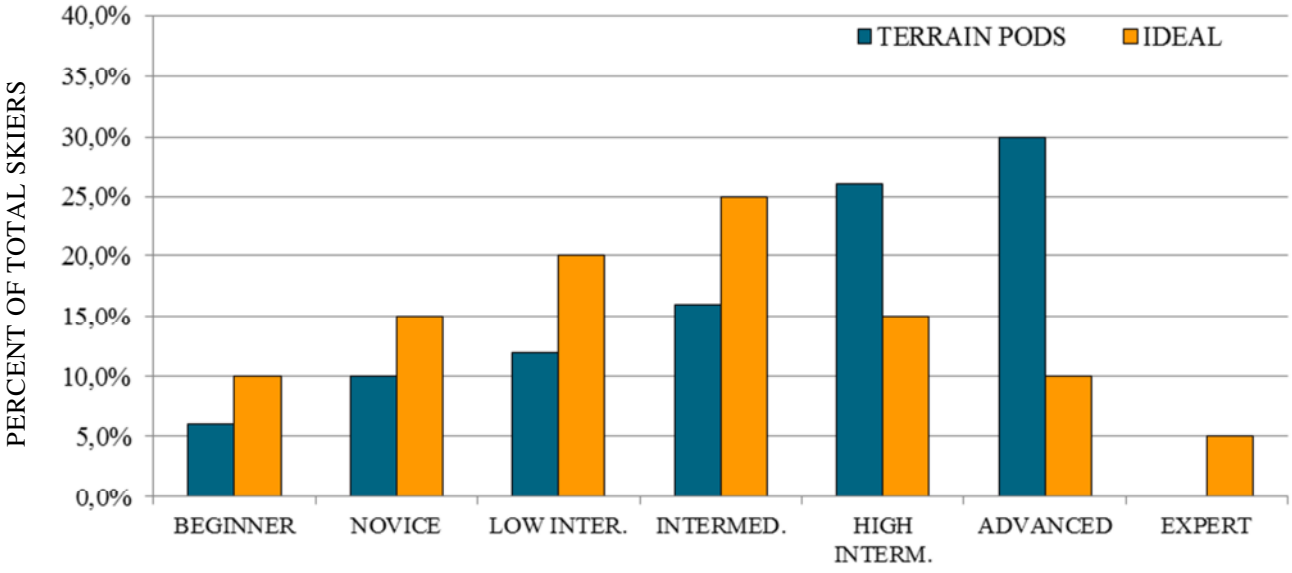


PLATE VI.6

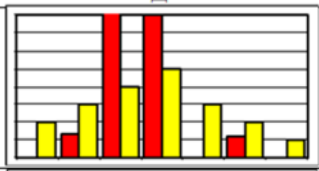
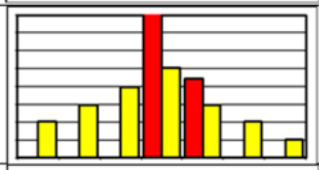
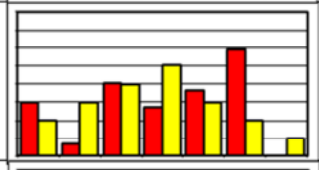
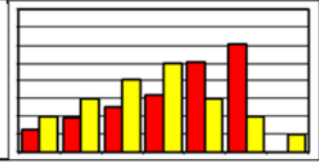
As shown in Plate VI.6, the terrain distribution is out of balance and shifted to the right with an excess of high intermediate and advanced ski terrain. There is a lack of beginner to intermediate skill class terrain within this area. However, there is a great variety of ski terrain which is a necessary precondition in order to develop a well-balanced ski area. The overall capacity of the identified pods would be approximately 4.740 skiers.

Comparison between Terrain Pod Zones

Table VI.14 provides summary of the primary mountain planning characteristics of each of the four zones of ski terrain identified within the Galičica study area. The Terrain Capacity Analysis provides an indication of the scale of the ski development possible, as well as an indication of the type (skill class) of terrain available to design a well-balanced ski area. As listed in Table VI.14, the sizes and balance of potential ski terrain vary widely in each zone. It should be noted that detailed design will usually improve upon the natural terrain balance somewhat by developing some pods more intensely than others and developing them in a way that improves the balance. In many cases, some pods will not be developed at all. It should also be noted that Ecosign anticipates many pods may turn out to not be developable after consultation with the client or different stakeholders due to many factors including environmental protection, access routes, land status, distance from potential base staging areas, etc.

Of course, one of the most important factors in choosing to develop a ski area is the natural terrain present; however, many other factors must be considered including accessibility, efficiency of the potential lift system, overall skier circulation, etc.

TABLE VI.14
SUMMARY OF TERRAIN CAPACITY ANALYSIS - ALL ZONES

	MOUNTAIN CAPACITY					
	Number of pods	Estimated Piste Capacity	Developed Pistes (hectares)	Piste Balance	Average Skier Capacity/Pod	Average Vertical Meters/Pod
NORTH ZONE	6	1.200	21,7		200	130
EAST ZONE	4	1.170	21,0		293	180
SOUTH ZONE	22	3.650	92,5		166	150
WEST ZONE	25	4.740	123,2		190	184

.2.4 Base Area Development Suitability Analysis

The Base Area Development Suitability Analysis that was prepared as part of Lot 1 has been revised following the acceptance of Annex 1 to the Lot 2 contract. The scope of the contract for Lot 2 has been expanded to include an assessment of the base area potential for the Lake Prespa side of the study area with a potential connection to the Ski Center, as well as the inclusion of overnight accommodation in the form of hotels, chalets and apartments as part of the ski center development. As a result, Ecosign's Base Area Development Suitability has been updated to provide an analytic basis for recommendations of the expansion of base area development in the Lot 2 Galičica Ski Center Master Plan.

The Base Area Development Suitability Analysis is a process that identifies and assesses potential suitable sites for the development of base area facilities to support the potential ski centre development. For the potential Galičica Ski Center, these facilities include day visitor parking, services, commercial space, additional summer and winter supporting recreation facilities, hotels, chalets, apartments and other development infrastructure. In conjunction with the Terrain Capacity Analysis, the Base Area Development Suitability Analysis is a preliminary step in the planning process where all suitable potential base area development sites are identified and evaluated. As a result of this step, the sites with the greatest base area development potential will be considered for design moving forward to Lot 2 Master Plan.

The Base Area Development Suitability Analysis is presented in Figures VI.10a and VI.10b. Figure VI.10a shows the Lake Ohrid/west side of the study area with connections to the West Zone ski terrain, while Figure VI.10b shows the Lake Prespa/East side of the study area with connections to the East Zone ski terrain and Central Plateau. Potential base area development zones are illustrated in this plan in two categorized; High Value and Low Value. Development zones with Low Value show areas where development could occur, but have a weak connection to the potential ski terrain or other areas with high value from a recreation and tourism point of view. Development zones with Low Value are illustrated in grey in Figures VI.10a and VI.10b but are not documented in detail in this report. Areas of High Value are illustrated in black and have been classified by area; Lake Ohrid (LO), West Plateau (WP), Central Plateau (CP) and Lake Prespa (LP). A total of eighteen parcels of land with High base area development potential have been identified within the Galičica study area based on the following criteria:

- Slope gradients <15%
- Proximity to the bottom of terrain pods or ski-in/ski-out
- Feasible potential gondola connection to potential ski terrain
- Proximity to terrain suitable for supporting winter and summer recreation facilities
- Views and aesthetic appeal

- Exposure to wind and sun
- Feasibility and cost of access

The Base Slope Analysis is overlaid in Figures VI.10a and VI.10b along with existing roads, existing development and the Terrain Capacity Analysis. The Base Slope Analysis clearly illustrates terrain with slopes that are suitable for the development of primary base area facilities in white and green, and areas that are too steep for development in red and blue. The development suitability of each of the five colours illustrated in the Base Area Slope Analysis is described in detail in Table II.2.

Slope gradients and proximity to potential ski terrain are the primary considerations when identifying suitable land for base area development. The spatial relationship between potential developable base area lands and the potential ski area facilities are evaluated using “Comfortable Skier Walking Distance” as a planning tool. “Comfortable Skier Walking Distance” is measured from the base of the ski terrain pods or potential access lift to determine the extents of developable land that is within walking distance to potential ski area facilities. Comfortable Skier Walking Distance is defined as the distance an individual wearing ski boots and carrying equipment can walk in a 10-minute period. Assuming a 2,7-kilometer per hour walking speed, comfortable skier walking distance is approximately 450 meters over level ground. This spatial relationship between the lifts and the base areas is critical, since skiers originating from accommodation and parking beyond comfortable walking distance of the lift bases will require secondary vehicular transportation to access the lifts, resulting in higher traffic and parking demands within the ski area facility. Potential staging points/lift terminals are shown on Figures VI.10a and VI.10b with a star symbol. The extent of Comfortable Skier Walking Distance is illustrated from these points with a red dashed line.

The 18 High Value parcels identified in the Base Area Development Suitability Analysis have been categorized into 4 general areas, as listed below. Low value parcels are illustrated in Areas 2, 3 and 6.

Area 1 - Lake Ohrid
Area 4 – Central Plateau
Area 5 – West Plateau
Area 7 – Lake Prespa

The potential development parcels located within these four areas are discussed in detail below. The size (hectares) and elevation (meters) of each parcel is summarized in Table VI.15.

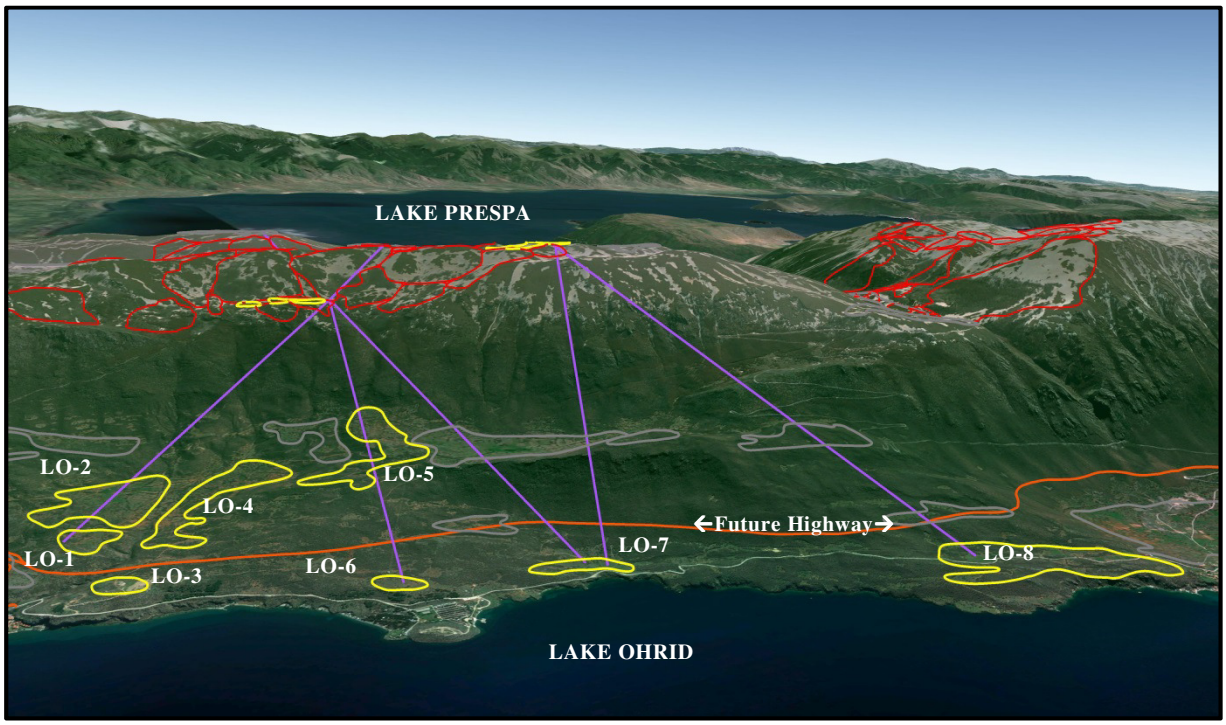
TABLE VI.15
GALIČICA
BASE AREA DEVELOPMENT SUITABILITY ANALYSIS

Parcel Number	Area ha.	Elevation m.
Area 1 - Lake Ohrid		
LO-1	4,6	835
LO-2	22,4	875
LO-3	2,7	775
LO-4	21	900
LO-5	24,4	1 040
LO-6	2,2	755
LO-7	5,0	730
LO-8	36,8	780
Subtotal Area 1	***119,1***	
Area 4 - Central Plateau		
CP-1	13,1	1 550
CP-2	70,0	1 500
CP-3	55,5	1 610
CP-4	14,0	1 650
Subtotal Area 4	***152,6***	
Area 5 - West Plateau		
WP-1	2,6	1 570
WP-2	1,0	1 585
Subtotal Area 5	***3,6***	
Area 7 - Lake Prespa		
LP-1	10,1	900
LP-2	29,0	900
Subtotal Area 7	***39,1***	
Total Study Area	**314,4**	

Area 1 – Lake Ohrid

The lower elevation threshold for terrain suitable for skiing has been identified for the Galičica study area as 1,500m. Terrain below this elevation will not retain adequate snowpack to allow for the development of alpine ski facilities; therefore potential base area development should be located at approximately this elevation to create an integrated development with ski center facilities. However, if the base area is located at 1,500m, road access needs to be developed and maintained to this elevation to provide access to the base area. For the Galičica study area, the primary road access is located at approximately 700m, with the new proposed highway planned at approximately 800m. Therefore, in order to provide road access to a resort base area at 1,500m, a road ascending between 700 and 800 meters would need to be maintained in the winter. Alternatively, a gondola transportation system can be used to provide access to the ski center facilities

which would allow the base area to be located below 1500m in elevation. This system creates a better experience for guests because of reduced driving time in winter conditions furthermore creates an opportunity for summer sightseeing utilizing the ski center facility. The potential high value base area development parcels for Area 1 have been identified based on the concept of providing a gondola access system to the ski area facilities. Eight potential base area development parcels along the shore of Lake Ohrid and five potential gondola alignments extending towards the West Plateau, Lako Signol and Kre Gola Buka summit are illustrated in Area 1 of Figure VI.9a. As shown on Table VI.15, a total of 119,1 hectares of developable land has been identified in Area 1, in parcels ranging from 2,2 hectares to 36,8 hectares. Comfortable Skier Walking Distance is shown around the bottom of each of the five conceptual gondola terminals.



Potential Base Area Development Parcels and Access Gondola Options from Lake Ohrid

Parcel LO-1 – 4,6 ha.

Parcel LO-1 is located to the south of the village of Peštani at an elevation of 835m. This parcel includes 4,6 hectares of very flat terrain sutiable for development of a gondola base area and parking facility. The parcel can be accessed from the new proposed highway at the intersection connecting to the south side of the village of Peštani. This parcel has good views of the Lake Ohrid shoreline and ski terrain to the west.

Parcel LO-2 – 22,4 ha.

Parcel LO-2 is located above Parcel LO-1, extending from 850 to 890m in elevation. This parcel includes slopes suitable for development with good views to the lake and should be considered for design in conjunction with Parcel PO-1.

Parcel LO-3 – 2,7 ha.

Parcel LO-3 is situated at 835m in elevation to the south of the village of Peštani, not far from the Hotel Desaret on the south side of the village. Parcel LO-3 is accessible from an existing dirt road and has excellent views of the Lake Ohrid shoreline. Parcel LO-3 has good potential for a bottom access gondola terminal location, however it may be too small to accommodate enough parking and facilities depending on the extent of resort development and if road access will also be provided.

Parcel LO-4 – 21,0 ha.

Parcel LO-4 is located on the south side of a drainage corridor and Parcels LO-1 and LO-2. This area has slopes suitable for development and can be considered for design in conjunction with Parcels LO-1 and L0-2.

Parcel LO-5 24,4 ha.

Parcel LO-5 includes terrain with slopes suitable for development at approximately 1 040m in elevation accessible from the road over the pass between Lake Ohrid and Lake Prespa. The flat terrain to the south of Parcel LO-5 is blocked by a ridge to the west from views to the lake therefore has not be classified as High Value potential base area development terrain. Parcel LO-5 includes terrain to the north of the ridge which is exposed to views of the lake.

Parcel LO-6 – 2,2 ha.

Parcel LO-6 is located directly east from the existing campsite, museum and ruins within Gradište Village at 750m elevation. This parcel is well situated because of its proximity to other tourist facilities on the lake, however with only 2,2 hectares, it may be too small for the scale of the potential ski centre development.

Parcel LO-7 – 5,0 ha.

Parcel LO-7 is located south of Gradište Village directly adjacent to the paved road and lakeshore. This parcel is easily accessed and includes a sizable area that would be adequate for all potential base area parking and facilities. Parcel LO-7 has good views towards the lake and accessibility to the existing road.

Parcel LO-8 – 36,8 ha.

Parcel LO-8 extends across the existing paved road on an upper and lower bench. The lower part of Parcel LO-8 may be private land. Parcel LO-8 has good views towards the lake but is disconnected from lakeside activities by steep cliffs. The feasibility of developing Parcel LO-8 should be checked on site.

Access Gondola Concepts

Five conceptual gondola alignments (A-E) are shown in Figure VI.10a with bottom terminals at Parcels LO-1 to LO-8 and top terminals at various points between 1.890m and 1.965m along the ridge north of the summit of Krle Gola Buka. Table VI.16 provides a summary of the basic specifications for each conceptual alignment. All five alignments are feasible from a technical point of view and the potential top stations shown for each potential alignment can be interchanged when a preferred bottom station and top station is chosen. The location of the gondola mid-station is flexible and will be designed in detail as part of the Master Plan.

TABLE VI.16
GALIČICA
POTENTIAL ACCESS GONDOLA

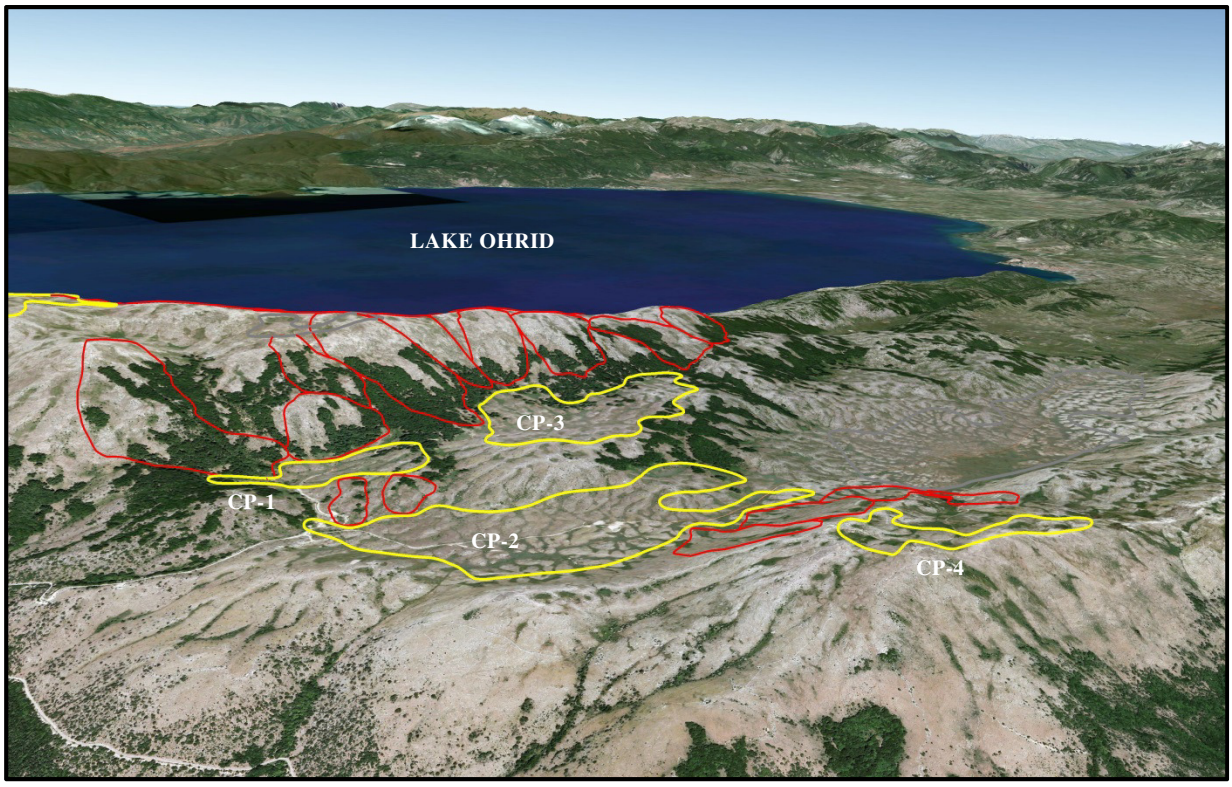
Conceptual Lift Line	Bottom Elevation m.	Top Elevation m.	Mid Station Elevation m.	Total Vertical m.	Horizontal Distance m.	Average Slope
Lake Ohrid						
A	835	1895	1580	1060	4180	25%
B	750	1895	1580	1145	3780	30%
C	725	1895	1580	1170	3265	36%
D	725	1965	n.a.	1240	3785	33%
E	785	1965	n.a.	1180	3610	33%
Lake Prespa						
F	875	1620	1670	775	5215	15%
G	875	1555	1560	680	4730	14%
H	890	1565	1560	675	4720	14%

Area 4 – Central Plateau

The majority of ski terrain pods are located on the east and west side of a north-south ridge line that extends through the middle of the study area. Between the two predominant mountain ranges in the Park, is a plateau characterized by gently sloping terrain suitable for development. The Central Plateau Zone in the Base Area Development Suitability Analysis includes four large parcels of developable land; Parcels CP-1, CP-2, CP-3 and CP-4. These four parcels comprise the largest area of developable base land within the study area with 152,6 hectares total. However, some of this land is outside of Comfortable Skier

Walking Distance and is disconnected from the ski terrain pods. The base area parcels identified in the Central Plateau Zone include a large area suitable for supporting recreation facilities such as a Nordic ski area, snowshoeing zone and backcountry skiing.

A potential access gondola from Lake Prespa will be considered in the Galičica Master Plan. The general concept for this gondola is to connect to the Central Plateau Zone, as shown on Figures VI.10a and VI.10b with the conceptual alignments F, G, and H which terminate in Parcels CP-1 and CP-3.



Potential Base Parcels at the Center Plateau

Parcel CP-1 – 13,1 ha.

Parcel CP-1 includes gently sloping terrain on a bench of land with terrain pods above and below it in elevation. Parcel 12 can be accessed from the existing mountain road and could serve as a base area for ski terrain in the West Zone. All of Parcel CP-1 is within walking distance to the ski terrain pods.

Parcel CP-2 – 70,0 ha.

Parcel CP-2 includes gently sloping terrain connected to two of the East Zone ski pods. The majority of Parcel CP-2 is within walking distance to either West or East Zones; however, the area is too large to be considered as one development given the development objectives of the Galičica Ski area. Parcel CP-2 is one of the largest areas within the study area and would be very suitable for Nordic

Skiing or other supporting winter recreation facilities. Parcel CP-2 includes former base area development and the existing deactivated surface lift.

Parcel CP-3 – 55,5 ha.

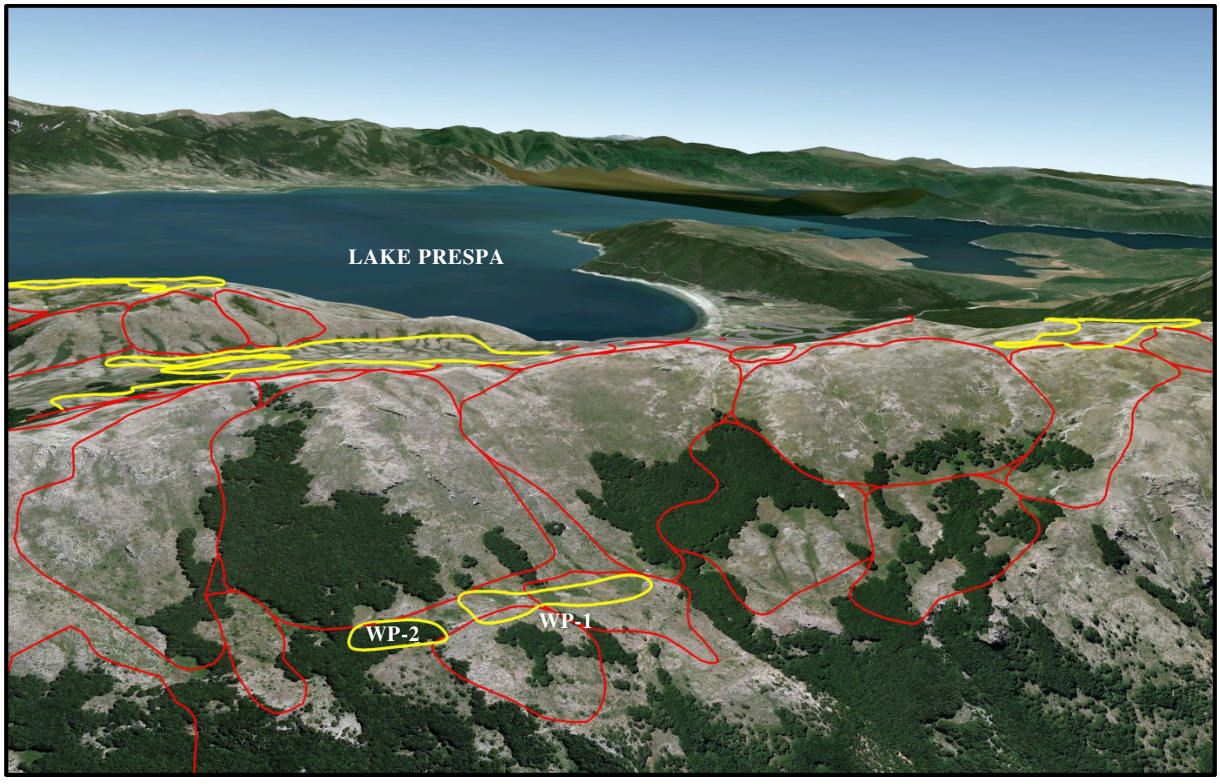
Parcel CP-3 is located adjacent to several ski terrain pods on the North West side of the West Zone. New roads connecting to the existing mountain road through Parcel CP-2 would need to be constructed to access Parcel CP-3. A large portion of this parcel is within walking distance to the bottom of the terrain pods which is the preferred development zone within this parcel.

Parcel CP-4 – 14,0 ha.

Parcel CP-4 is located at the summit of Mt. Tomoros at 1673m and includes 14,0 hectares of developable land within walking distance from the summit. This area should be considered for design in conjunction with gondola concept F and a mid-station at the top of Tomoros. Summer and winter recreation activities are suitable for Parcel CP-4.

Area 5 – West Plateau

The steep west-facing slopes on the Lake Ohrid side of the National Park are interrupted by a bench of gently sloping topography which has been identified as the West Plateau. The West Plateau can be accessed with a mid-station on the potential access gondola from Lake Ohrid to the ridge north of the summit of Krle Gola Buka. Two parcels have been identified within the West Plateau area.



Parcel WP-1 – 2,6 Ha.

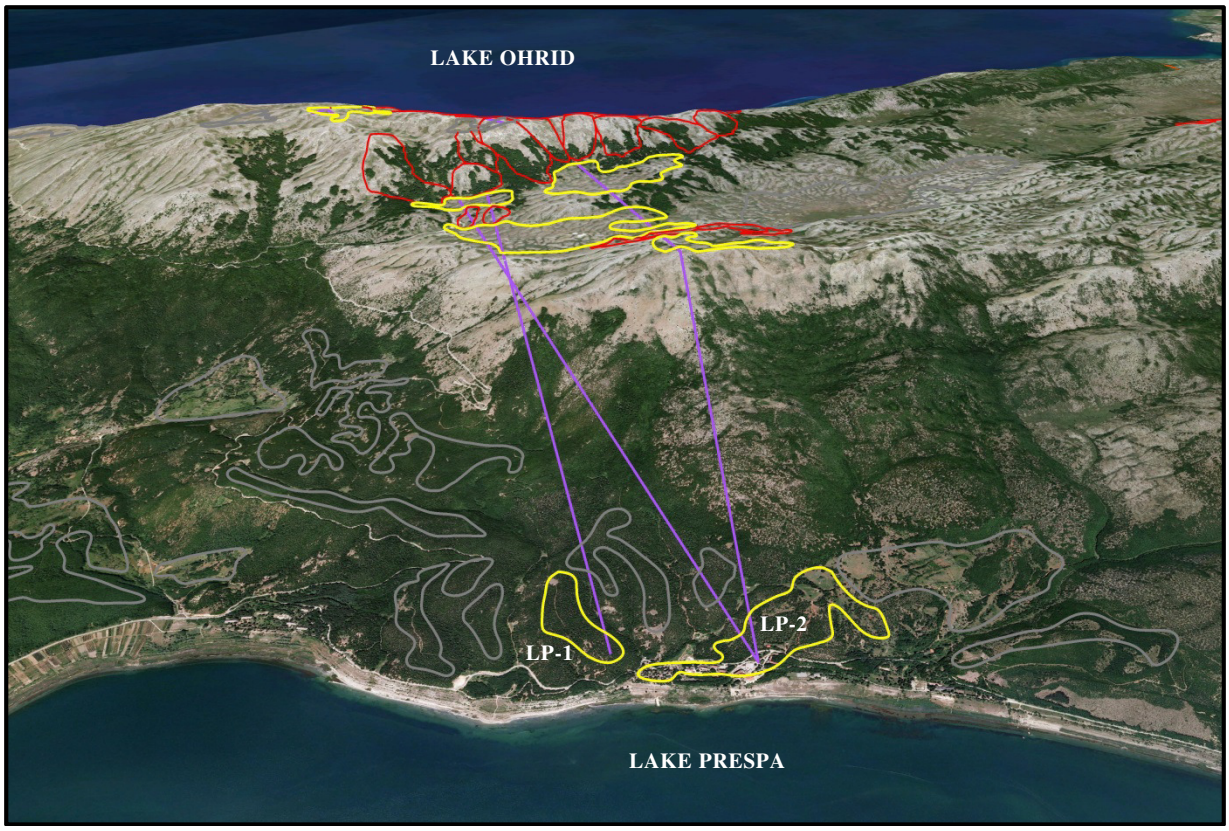
Parcel WP-1 is the larger of the two West Plateau parcels and is suitable for the mid-station terminal and other skier services in this area. This parcel will require large areas of circulation space for non-skiers and sightseers, as well as return-cycle skiers from the upper ridge.

Parcel WP-2 – 1,0 Ha.

Parcel WP-2 is located on the north side of the West Plateau at 1.570 meters in elevation. This area could be utilized for snow-play activities, a beginner area or other supporting recreation activities.

Area 7 – Lake Prespa

The base area analysis for the east side of Galičica National Park including the western shore of Lake Prespa is illustrated in Figure VI.10b. This plan shows two areas that have been identified as having High Value base area development potential in proximity to the Oteshevo development. Three conceptual gondola alignments (F, G & H) illustrate how the Lake Prespa development parcels can be connected to the potential ski terrain and the Central Plateau. These options will be explored in the Master Plan phase. A ski connection to Lake Prespa is not feasible due to low elevation, unfavorable aspect and steep terrain.



Potential Base Area Development Parcels and Access Gondola Options from Lake Prespa

Parcel LP-1 – 10,1 ha.

Parcel LP-1 is located on the west side of the existing road and includes 10 hectares of developable land. This area could be developed with a parking area and gondola terminal; however its location away from the lake shore makes it unsuitable for hotel development.

Parcel LP-2 – 29,0 ha.

Parcel LP-2 includes the existing Oteshevo development (abandoned hotels) on the Prespa lake shore as well as a large area of developable land to the west. Redevelopment and renovation of the existing Oteshevo hotels is the highest value development opportunity for the Lake Prespa zone. While a gondola connection to the Central Plateau is technically feasible, opportunities for the development of tourism products and potential market on the Lake Prespa side are limited and greatly reduced in relation to the Lake Ohrid side.

Base Area Development Suitability Analysis – Conclusion

Potential base area development parcels within the Galičica study area have been identified in four areas; Lake Ohrid, Central Plateau, West Plateau and Lake Prespa. Through discussions with the client during Phase 1 work, Ecosign has recommended that a gondola be considered as the preferred transportation infrastructure for accessing the ski resort facilities as an alternative to improving the existing road. The potential access gondola from the Lake Ohrid side of the Park will also present an excellent summer tourism and winter sightseeing opportunity for the region. A potential connection from the Ski Center to the Lake Prespa side will also be considered in the Lot 2 Master Plan. During the next phase of planning, a preferred top and bottom location for the gondola will be determined, as well as mountain top facilities for skiers and sightseers for four-season use. Potential base area development will include a parking area and tourist services at the base of the gondola with supporting services, food and beverage and other facilities at the top of the gondola. Hotel and real estate development in proximity to the base of the gondola or in areas of high base area development value will be considered in the Master Plan as a means of adding value to attract a concessioner for the project. Potential development parcels within the Lake Ohrid, West Plateau, Central Plateau and Lake Prespa Areas will be considered moving forward to the Master Plan phase.

.2.5 Risks of Environmental Degradation and the Level of Threat to Natural Values in the Galičica National Park

The Galičica National Park is a preserved area with huge diversity of rare and valuable flora and fauna. Since the study area is equal to the National Park zone it will be inevitable to propose future developments within the park boundary. However, the zoning of the park as described in Section II.3 – National Park Zoning indicates that there are areas more suitable for future development and also highly sensitive areas which should not be touched.

This analysis also indicates the potential ski pods and base area parcels falling within the boundaries of the UNESCO World Heritage of Ohrid Region.

The following tables give an overview of the locations of the identified ski pods and base area parcel in relation to the National Park Zones and the boundaries of the World Heritage of Ohrid Region. This analysis provides information concerning the risk of environmental degradation and the level of threat to natural values in the park. The evaluation of the impact of the proposed development on the status of the World Heritage of Ohrid Region can be made against the "selection criteria" described in Section II.3. It provides a robust and practical way to infer the potential vulnerability of the natural system in the management zones to potential developments and thus in a next step this helps to select the most

appropriate zone, ski pods and base area parcels for future ski area developments from an environmental perspective.

TABLE VI.17
INTERSECTION OF THE SKI PODS AND THE MANAGEMENT ZONES OF THE GALIČICA NATIONAL PARK

Ski Pod #	Management Zone
N1	Entirely within the Zone of Active Management
N2	Entirely within the Zone of Active Management
N3	Entirely within the Zone of Active Management
N4	Entirely within the Zone of Active Management
N5	Entirely within the Zone of Active Management
N6	Entirely within the Zone of Active Management
E1	Entirely within the Zone of Active Management
E2	Entirely within the Zone of Active Management
E3	Entirely within the Zone of Active Management
E4	Entirely within the Zone of Active Management
S1	Predominantly within the Buffer Zone/ partly within the Zone of Strict Protection
S2	Predominantly within the Buffer Zone
S3	Entirely within the Buffer Zone
S4	Entirely within the Buffer Zone
S5	Entirely within the Zone of Strict Protection
S6	Entirely within the Zone of Strict Protection
S7	Entirely within the Zone of Strict Protection
S8	Predominantly within the Zone of Strict Protection/partly within the Buffer Zone
S9	Entirely within the Zone of Strict Protection
S10	Entirely within the Zone of Strict Protection
S11	Entirely within the Zone of Strict Protection
S12	Entirely within the Zone of Strict Protection
S13	Entirely within the Zone of Strict Protection
S14	Entirely within the Zone of Strict Protection
S15	Entirely within the Zone of Strict Protection
S16	Entirely within the Zone of Strict Protection
S17	Entirely within the Zone of Strict Protection
S18	Entirely within the Zone of Strict Protection
S19	Entirely within the Zone of Strict Protection
S20	Entirely within the Zone of Strict Protection
S21	Entirely within the Zone of Strict Protection
S22	Entirely within the Zone of Strict Protection
W1	Entirely within the Zone of Active Management
W2	Entirely within the Zone of Active Management
W3	Entirely within the Zone of Active Management
W4	Entirely within the Zone of Active Management
W5	Entirely within the Zone of Active Management
W6	Entirely within the Zone of Active Management
W7	Entirely within the Zone of Active Management
W8	Entirely within the Zone of Active Management
W9	Entirely within the Zone of Active Management
W10	Entirely within the Zone of Active Management
W11	Entirely within the Zone of Active Management

W12	Entirely within the Zone of Active Management
W13	Entirely within the Zone of Active Management
W14	Entirely within the Zone of Active Management
W15	Entirely within the Zone of Active Management
W16	Entirely within the Zone of Active Management
W17	Entirely within the Zone of Active Management
W18	Entirely within the Zone of Active Management
W19	Entirely within the Zone of Active Management
W20	Entirely within the Zone of Active Management
W21	Entirely within the Zone of Active Management
W22	Entirely within the Zone of Active Management
W23	Entirely within the Zone of Active Management
W24	Entirely within the Zone of Active Management
W25	Entirely within the Zone of Active Management

Source: Galičica National Park Management

TABLE VI.18
INTERSECTION OF POTENTIAL BASE AREA PARCELS AND THE MANAGEMENT ZONES OF GALIČICA NATIONAL PARK

Parcel #	Management Zone
Parcel LO-1	Entirely within the Zone of Sustainable Use
Parcel LO-2	Entirely within the Zone of Sustainable Use
Parcel LO-3	Entirely within the Zone of Sustainable Use
Parcel LO-4	Entirely within the Zone of Sustainable Use
Parcel LO-5	Entirely within the Zone of Sustainable Use
Parcel LO-6	Entirely within the Zone of Sustainable Use
Parcel LO-7	Entirely within the Zone of Sustainable Use
Parcel LO-8	Predominantly within the Zone of Active Mgm./partly within the Zone of Sustainable Use
Parcel CP-1	Entirely within the Zone of Active Management
Parcel CP-2	Entirely within the Zone of Active Management
Parcel CP-3	Entirely within the Zone of Active Management
Parcel CP-4	Entirely within the Zone of Active Management
Parcel WP-1	Entirely within the Zone of Active Management
Parcel WP-2	Entirely within the Zone of Active Management
Parcel LP-1	Entirely within the Zone of Sustainable Use
Parcel LP-2	Entirely within the Zone of Sustainable Use

Source: Galičica National Park Management

TABLE VI.19
INTERSECTION OF POTENTIAL SKI AREA PODS AND THE AREA OF WORLD HERITAGE OF OHRID REGION

Ski Pod #	Management Zone
N1	Entirely within the area of the World Heritage of the Ohrid Region
N2	Entirely within the area of the World Heritage of the Ohrid Region
N3	Entirely within the area of the World Heritage of the Ohrid Region
N4	Entirely within the area of the World Heritage of the Ohrid Region
N5	Entirely within the area of the World Heritage of the Ohrid Region
N6	Entirely within the area of the World Heritage of the Ohrid Region
E1	Entirely within the area of the World Heritage of the Ohrid Region
E2	Entirely within the area of the World Heritage of the Ohrid Region
E3	Entirely within the area of the World Heritage of the Ohrid Region
E4	Entirely within the area of the World Heritage of the Ohrid Region
S1	Entirely within the area of the World Heritage of the Ohrid Region
S2	Entirely within the area of the World Heritage of the Ohrid Region
S3	Entirely within the area of the World Heritage of the Ohrid Region
S4	Entirely within the area of the World Heritage of the Ohrid Region
S5	Entirely within the area of the World Heritage of the Ohrid Region
S6	Entirely within the area of the World Heritage of the Ohrid Region
S7	Entirely within the area of the World Heritage of the Ohrid Region
S8	Outside the area of the World Heritage of the Ohrid Region
S9	Entirely within the area of the World Heritage of the Ohrid Region
S10	Outside the area of the World Heritage of the Ohrid Region
S11	Predominantly outside the area of the World Heritage of the Ohrid Region
S12	Entirely within the area of the World Heritage of the Ohrid Region
S13	Entirely within the area of the World Heritage of the Ohrid Region
S14	Outside the area of the World Heritage of the Ohrid Region
S15	Outside the area of the World Heritage of the Ohrid Region
S16	Outside the area of the World Heritage of the Ohrid Region
S17	Entirely within the area of the World Heritage of the Ohrid Region
S18	Entirely within the area of the World Heritage of the Ohrid Region
S19	Entirely within the area of the World Heritage of the Ohrid Region
S20	Entirely within the area of the World Heritage of the Ohrid Region
S21	Entirely within the area of the World Heritage of the Ohrid Region
S22	Entirely within the area of the World Heritage of the Ohrid Region
W1	Entirely within the area of the World Heritage of the Ohrid Region
W2	Entirely within the area of the World Heritage of the Ohrid Region
W3	Entirely within the area of the World Heritage of the Ohrid Region
W4	Entirely within the area of the World Heritage of the Ohrid Region
W5	Entirely within the area of the World Heritage of the Ohrid Region
W6	Entirely within the area of the World Heritage of the Ohrid Region
W7	Entirely within the area of the World Heritage of the Ohrid Region
W8	Entirely within the area of the World Heritage of the Ohrid Region
W9	Entirely within the area of the World Heritage of the Ohrid Region
W10	Entirely within the area of the World Heritage of the Ohrid Region
W11	Entirely within the area of the World Heritage of the Ohrid Region
W12	Entirely within the area of the World Heritage of the Ohrid Region
W13	Entirely within the area of the World Heritage of the Ohrid Region
W14	Entirely within the area of the World Heritage of the Ohrid Region
W15	Entirely within the area of the World Heritage of the Ohrid Region

W16	Entirely within the area of the World Heritage of the Ohrid Region
W17	Entirely within the area of the World Heritage of the Ohrid Region
W18	Entirely within the area of the World Heritage of the Ohrid Region
W19	Entirely within the area of the World Heritage of the Ohrid Region
W20	Entirely within the area of the World Heritage of the Ohrid Region
W21	Entirely within the area of the World Heritage of the Ohrid Region
W22	Entirely within the area of the World Heritage of the Ohrid Region
W23	Entirely within the area of the World Heritage of the Ohrid Region
W24	Entirely within the area of the World Heritage of the Ohrid Region
W25	Entirely within the area of the World Heritage of the Ohrid Region

Source: Galičica National Park Management

TABLE VI.20
INTERSECTION OF POTENTIAL BASE AERA PARCELS AND THE AREA OF WORLD HERITAGE OF OHRID REGION

Parcel N^{o}	Management Zone
Parcel LO-1	Entirely within the area of the World Heritage of the Ohrid Region
Parcel LO-2	Entirely within the area of the World Heritage of the Ohrid Region
Parcel LO-3	Entirely within the area of the World Heritage of the Ohrid Region
Parcel LO-4	Entirely within the area of the World Heritage of the Ohrid Region
Parcel LO-5	Entirely within the area of the World Heritage of the Ohrid Region
Parcel LO-6	Entirely within the area of the World Heritage of the Ohrid Region
Parcel LO-7	Entirely within the area of the World Heritage of the Ohrid Region
Parcel LO-8	Entirely within the area of the World Heritage of the Ohrid Region
Parcel CP-1	Entirely within the area of the World Heritage of the Ohrid Region
Parcel CP-2	Entirely within the area of the World Heritage of the Ohrid Region
Parcel CP-3	Entirely within the area of the World Heritage of the Ohrid Region
Parcel CP-4	Predominantyl within the area of the World Heritage of the Ohrid Region
Parcel WP-1	Entirely within the area of the World Heritage of the Ohrid Region
Parcel WP-2	Entirely within the area of the World Heritage of the Ohrid Region
Parcel LP-1	Outside the area of the World Heritage of the Ohrid Region
Parcel LP-2	Outside the area of the World Heritage of the Ohrid Region

Source: Galičica National Park Management

VI.3 CAPITAL BUDGET – Step 3 update

In Lot 2, Step 4/5 of the planning process this section was

replaced by report section IX.

VII. SKI CENTER MASTER PLAN

.1 Introduction

Ecosign has carried out a technical assessment and terrain suitability analysis for the Galičica study area and developed a preliminary development concept. For this concept an Order of Magnitude capital budget was calculated to determine if it was advisable to enter the subsequent planning phase to develop a detailed Master Plan for the ski center of Galičica. After review of the findings and conclusions, the client decided to enter into the next step of planning. Based on the previous analysis and feedback and requests from the client listed in Annex 1 to the Contract no. 02-4922/6, a Master Plan was developed. The Master Plan for the ski center Galičica is illustrated in plan view on figures VII.1. Galičica Ski Center - Master Plan Overview and VII.2 Galičica Ski Center - Mountain Master Plan. Figures VII.5a through VII.5d provide 3D views of the envisioned ski center in the Galičica National Park.

.2 Goals and Objectives

The overall vision for the Galičica Ski Center is to develop the previously identified “West Zone” and to provide access to the ski center facilities by means of a gondola system from the Lake Ohrid. After buildout an additional access lift could also provide accesss from the Lake Prespa side. These gondola systems create also opportunity for sightseeing and other 4 season recreation activities within the ski center and National Park. This section of the Master Plan outlines the ski area facilities proposed for the ski resort development in Galičica.

Generally, a ski area Master Plan involves planning the installation of new facilities, as well as the replacement of existing facilities on the mountain and in the base area. To provide guests with the best possible ski experience, modern ski areas require the most efficient, user-friendly lift and piste systems possible. Facilities are generally constructed over several phases of development, increasing the quality and size of the area as time progresses and the market dictates. In order to accomplish this, it is necessary to have a complete understanding of the total project at build-out so that the facilities can be balanced and capital invested effectively. The proposed developments have been phased in three stages of implementation.

The objectives of the Galičica Ski Center Master Plan are listed below:

- Optimize the utilization and operational efficiency of the proposed infrastructure.
- Balance lift and trail capacities wherever possible.
- Provide maximum capacity and comfort for minimum capital and operating costs.
- Provide base staging facilities (skier services, day skier parking, restaurant facilities, etc.) in balance with mountain access and capacity requirements.
- Optimize quality of the facilities to meet the expectations of the skier market.
- Develop beginner facilities and terrain and provide additional recreational activities other than skiing or snowboarding.
- Define goals and projects to guide the client and inform public agencies during the review and decision making period.

The following section describes the proposed installation of new equipment and facilities for the development of the Galičica Ski Center. The Galičica project will require a significant investment of capital to develop the necessary facilities to make it desirable to the regional and destination skiing and snowboarding public in today's competitive marketplace. The facilities should be planned and installed so that Galičica Ski Center can become successful and competitive in the international destination and regional market.

We have utilized a number and letter code to indicate the type of lift installations proposed. The coding is illustrated below.

MC	"Magic Carpet" or "Moving Carpet", a conveyor-belt beginner lift
PL	Platter lift
4CLF	Fixed grip 4-seater chairlift
8MGD	8-passenger gondola lift

The Galičica Master Planning process aims to use the most suitable ski lift and planning technology currently available. Since technology and the skier market change over time, the Galičica Master Plan should ultimately be used as a flexible document, subject to periodic review.

A Master Plan is the first step in the development process and by its very nature identifies an individual site's constraints and opportunities and then focuses upon design to resolve issues and concerns identified during the planning process.

The final Master Plan will be a tool to guide the development of the Galičica site and does not preclude the requirements for detailed design, engineering and architecture prior to on-site construction activities. As the ski area proceeds through the detailed design and field layout stages, minor changes to the Master Plan in terms of the site specific placement of buildings, lifts, ski courses and utilities may occur within the prescribed development area boundaries.

.3 Mountain Concept

.3.1 Mountain Planning Methodology

When designing a system of lifts and pistes, the ultimate development should be planned in order that future lifts and additional pistes will not create conflicts, congestion, crowding or worn-out snow conditions. Utilization of various lift loading and unloading patterns, as well as grooming coverage, can direct skiers onto preferred piste systems to improve piste utilization or avoid major congestion areas.

Lifts should be located to service the best skiing terrain. Pistes should be planned to provide the best skiing opportunities without wasting terrain, and then lifts located to best serve these pistes, since lifts are merely a means of access. The type of lift may vary, depending on the natural terrain it must cross and serve, as well as the required capacity. The most favorable type of lifts will be proposed for each specific location.

Lifts should not be located simply because good upper and lower terminal locations have been selected, or to minimize construction costs. There are enough lift design alternatives available to accommodate a wide variety of sites. Lift construction costs should normally be a secondary consideration when compared to skiing quality, aesthetics or environmental factors. Ski lift loading and unloading terminals are preferably located in protected areas on slopes less than 20 percent. Adequate space must be allotted for lift queues, safe stopping, unloading areas and general congregation areas at both the upper and lower lift terminals.

When the majority of ski lift capacity is separated from the base area, it is important that the base area lifts are designed so that sufficient capacity is provided for efficient distribution of skiers throughout the area's lift systems, within a two-hour staging period.

.3.2 Mountain Planning Parameters

In order to determine the potential skier carrying capacity of the terrain within the Galičica study area, we have utilized the planning parameters established in the previous sections of this report and listed them in Table VII.1.

TABLE VII.1
GALIČICA
MOUNTAIN PLANNING PARAMETERS FOR BUILD-OUT

Skill Classification	Skill Mix	Acceptable Terrain Gradients	Skier Demand [VTM / Day]	Skier Densities [Skiers per ha] At Area	On Piste
1 Beginner	10%	8 – 15%	705	75	30
2 Novice	15%	15 – 25%	1.595	75	30
3 Low Intermediate	20%	25 – 35%	2.125	60	23
4 Intermediate	25%	30 – 40%	2.830	60	23
5 High Intermediate	15%	35 – 45%	3.840	45	18
6 Advanced	10%	45 – 60%	4.460	22,5	10
7 Expert	5%	60% +	6.370	30	15

Based on our experience and the Macedonian skier market characteristics, we have applied a skier density of three skiers per hectare for off-piste terrain. Furthermore we have doubled the skier density for the main beginner zone to 150 skiers per hectare as we believe that this number better reflects the expected number of beginner skiers practicing at the Galičica ski area at on time.

.3.3 Mountain Infrastructures

General Description

The Mountain Development Concept Plans (Figure VII.1 and VII.2) illustrate the proposed concept for the ***Galičica Ski Center*** at the build-out stage of development. It has been developed after analysis of the basic data, site inspections and requests from the client.

Due to its great importance for this study and as already indicated prior in this report (Section II.4 – Climate/Solar Analysis), we again want to point out *that no weather or snow measurements of the Galičica massive have been* provided to Ecosign. Our assessment and assumptions are based on data that has been interpolated from areas in the proximity of the site and thus the overall data basis is not very reliable.

***During this and last year's winter sit*e visits Ecosing staff members have experienced unfavorable on-site snow and weather situations. This mainly because of the prevailing strong winds along with very bad visibility due to heavy fog in the alpine areas.**

Proper assessment of the weather pattern at the area of interest is an indispensable precondition in order to judge whether or not the site is suitable for ski area development! Therefore the weather patterns on the mountain of the *Galičica National Park should be investigated in more detail in order to make* reliable recommendations and a founded statement about the suitability of the site for development of a ski center. Consequently we strongly suggest collecting weather data at exposed areas on the mountain tops and the potential lift terminal locations.

By reason of the area's year round attractiveness with significant tourism potential also in summer, Ecosign believes that the Galičica Ski Center should be designed as a tourism attraction not only for alpine skiing but as a holistic project with focus on four-season tourism. Also the natural beauty of the site and the biological diversity of the flora and fauna in the National Park constitute a great value for the region which should be preserved as much as possible. If done right, nature preservation and tourism are not contradictory. Such a project of course causes some impacts on the nature and therefore we believe that the project has to be based on the concept of gentle tourism and that authorities of the National Park should be included in the planning and development process as much as possible.

The development of the resort is envisioned to take place over many years and therefore construction will need to be phased over time.

The mountain concept illustrates lift and piste systems which work both for return cycle skiing and for ease of movement around the resort. It is very important to blend these two uses during design to create an efficient layout, so that the benefit from every investment (lift or piste) is maximized. Obviously, an expensive lift which provides transportation only, and no return cycle skiing, will offer little return on investment from the skiing business. The lift and piste development concepts are described in general terms below.

As illustrated on Fig. VII.2, the Master Plan concept at build-out includes a total of 4 major lifts systems (not incl. Moving Carpet lifts). These lifts have the capacity to comfortably service approximately 3.000 skiers per day.

Overview of the envisioned Mid-Mountain Zone and the west-facing ski terrain

.3.3.1 Lift Description and Specification

Figure VII.1 and VII.2 illustrate the Galičica Ski Center Master Plan Concept in plan view. The mountain development concept is an advanced and more mature version of the Preliminary Development Concept described in Section IV of this report. The big picture did not change but there have been several adjustments during the design process due to findings from site visits and also the more detailed mapping resulted in a more refined version of the concept.

The Mountain Development Concept includes a total of 7 proposed ski lifts; one detachable monocable eight-passenger gondola (Lift 1), whichwill be linked with an intermediate station, 2 fixed grip quadruple chairlifts (Lift 3 and Lift 4), 1 platter surface lift (Lift 2) and 3 moving carpet conveyor belt lifts (MC1, MC2, MC3). Lifts in this configuration support approx. 3.000 skiers per day. The specifications for the proposed Galičica Ski Center lifts are listed in Table VII.2.

Lift 1

Lift 1, a detachable eight passenger gondola lift will be the prime lift in the Galičica Ski Center and also the first lift that will be installed. Starting from the bottom station located on a natural plateau above and between Gradiste and Peštani (Upper Peštani Base) at an elevation of 840 meters, the lift provides access for visitors to the alpine facilities of the Galičica Ski Center.

A mid-station with unloading and loading opportunity is planned at an elevation of 1.580 meters. Beginners and Novice skiers will exit at the mid-station from where they have easy access to the envisioned beginner zone at the mid-mountain area, featuring several moving carpet lifts and one surface platter lift. Also other recreational activities will be offered in the mid-mountain area such as Snow Tubing, Nordic Skiing, Snowshoeing or a Skidooing track for kids.

A mid-mountain lodge will offer main skier service facilities including a restaurant. We also suggest offering some staff accommodation at the mid-mountain lodge for easier start-up of the operation.

Eight-passenger gondola ropeway system with mountain top restaurant in the background.

Lift 1 has a rated capacity of 1.800 passengers per hour. The first section (Lift 1A) is for access from and egress to the base area for skiers and non-skiing visitors. The rated capacity was designed so that at a peak day the staging time will be less than two hours. The gondola ropeway system will also be utilized to cover supply of goods and food to the mid-mountain and the mountain top.

The second section (Lift 1B) serves four pistes for return-cycle-skiing at west to north-west facing slopes as well as attractive off-piste terrain. The terrain accessed by the gondola is relatively steep and ideal for high intermediate and advanced skiers. The proposed construction road can be utilized in winter as a skiway (Skiway S1), but due to the steep terrain it was not feasible to designed the road wide enough in order to use it as a piste for repetitive skiing.

This section will be able to support approximately 610 skiers at one time offering 317 vertical meters. Lift 1B will also be the prime staging lift for skiers to get to Lift 3 and Lift 4.

At the top of Lift 1, we envision a mountain top restaurant offering serveral skier services facilities and a restaurant including a spacious patio from where visitors can enjoy the spectacular view to the mountains of the National Park and the two Lakes.

Lift 2

Lift 2 is a surface platter lift with a rated capacity of 600 pph. and can comfortably support up to 170 skiers at one time. The lift caters one wide 200 meters long beginner slope (Piste 2A), a run ideal for beginners and novice skiers to learn how to turn and to work on their ski technique.

PL - Surface Platter Lift for 1 Passenger per Carrier.

Lift 2, together with the moving carpets located at the mid-mountain zone constitute the main beginner center of the envisioned Galičica ski center.

Beginner Zones

Moving carpets are the ideal means of uphill transportation for beginners. Aiming to provide the best learning conditions possible, three moving carpet beginner lifts (MC1, MC2 and MC3) are planned at the mid-mountain area on the Lake Ohrid side of the ski area. The beginner slopes will have an inclination of 8% to 12% with ideally a flat area on top and a flat run out zone at the bottom. These beginner lifts will allow newbies to the snow sports the opportunity to make their first experience on skis or a snowboard. Furthermore, spacious Snow Play and Sliding areas are planned in the mid-mountain area providing additional attractions for kids and non-skiers.

Beginner area with a Moving Carpet lift.

Lift 3

Lift 3 provides skiing on the east side of the mountain range and offers a wide variety of ski pistes suitable for most skier ability levels, i.e. from novice to advanced skiers. This lift is proposed as a fixed grip quadruple chairlift with a rated capacity of 1.500 pph. Ecosign proposes a clockwise rotation of the chairlift and a structured loading system as illustrated on Fig. VIII.10. With the top station of the chairlift next to the mountain top restaurant at an elevation of 1.895 meters and the bottom station located at 1.560 meters, this lift offers 335 vertical meters and will be able to comfortably support approximately 1.150 skiers on 7 pistes.

4CLF - Fixed Grip Four-Passenger Chairlift

Lift 4

Lift 4 is located approximately 600 meters south of Lift 1B accessible via the top section of piste 1D starting from the top of Lift 1 - the hub of the Galičica ski center. This lift caters west to north-west facing slopes predominantly attractive for intermediate, high intermediate and advanced skiers. Like the aforementioned Lift 3, also this ski lift is proposed as a fixed grip four-passenger chairlift with an hourly rated capacity of 1.600 pph., offering 336 vertical meters of skiing. Lift 4 will be able to comfortably support approximately 970 skiers at one time.

4CLF - Fixed Grip Four-Passenger Chairlift with loading carpet

TABLE VII.2
GALIČICA
LIFT SPECIFICATIONS – BUILD-OUT

Lift Number **Lift Type**	**1A** **8MGD**	**1B** **8MGD**	**2** **PL**	**3** **4CLF**	**4** **4CLF**	**MC1** **MC**	**MC2** **MC**	**MC3** **MC**	**TOTAL**
Top Elevation [m]	1.580	1.895	1.580	1.895	1.933	1.580	1.580	1.582	
Bottom Elevation [m]	840	1.580	1.547	1.560	1.597	1.573	1.576	1.580	
Total Vertical [m]	740	315	33	335	336	7	4	2	2.441
Horizontal Distance [m]	2.602	861	210	1.040	879	55	35	20	
Slope Distance [m]	2.705	917	213	1.093	941	55	35	20	10.682
Average Slope [%]	28%	37%	16%	32%	38%	12%	10%	8%	24% Mean
Rated Capacity	1.800	1.800	600	1.500	1.600	1.200	1.200	1.200	12.100
V.T.M./Hr.(000)	1.332	567	20	503	538	8	4	2	3.777
Rope Speed [m/sec]	5,0	5,0	2,0	2,5	2,5	0,9	0,9	0,9	
Trip Time [min]	9,02	3,06	1,77	7,28	6,27	1,03	0,65	0,37	
Operating Hr./Day	8,0	8,0	7,5	7,0	7,0	7,5	7,5	7,5	7,6
Loading Effic. [%]	95%	95%	80%	85%	85%	80%	80%	80	
Access Reduction[%]	100%	38%	0%	4%	0%	5%	30%	50%	
Potential SCC [Skiers/Day]	**0**	**610**	**170**	**1.150**	**970**	**60**	**30**	**10**	**3.000**

.3.3.2 Piste Specifications and Capacities

Table VII.3 provides the necessary information on the pistes that are proposed at the build-out stage of the Galičica ski center.

TABLE VII.3
GALIČICA
PISTE SPECIFICATIONS AT BUILD-OUT

Trail Name	Trail No.	Skill Class	Total Vert. [m]	Horz. Dist. [m]	Slope Dist. [m]	Slope Average [%]	Slope Steep. [%]	Ave. Width [m]	Horz. Area [ha]	Slope Area [ha]	Skiers at Area Density [skier/ha]	Total
Lift 1B												
	1A	6	248	741	781	33%	54%	29	2,17	2,29	22,5	50
	1B	5	258	842	881	31%	48%	34	2,85	2,98	45	130
	1C	5	300	871	921	34%	50%	34	2,97	3,14	45	140
	1D	6	315	1.215	1.255	26%	51%	30	3,60	3,72	22,5	80
	Off-Piste	7	233	380	446	61%	70%	-	21,00	24,63	3	70
Total Lift 1B*	4*				3.838*					12,13*		470
Lift 2												
	2A	1	33	200	203	17%	20%	44	0,88	0,90	150	140
Total Lift 2	1				203					0,90		140
Lift 3												
	3A	2	335	2.530	2.552	13%	18%	21	5,20	5,25	75	390
	3B	3	97	293	309	33%	39%	38	1,10	1,16	60	70
	3C	4	145	485	506	30%	43%	41	2,00	2,09	60	130
	3D	5	205	653	715	30%	49%	36	2,50	2,61	45	120
	3E	6	222	640	677	35%	53%	30	1,90	2,01	22,5	50
	3F	5	120	385	403	31%	46%	34	1,30	1,36	45	60
	3G	3	50	185	192	27%	31%	46	0,85	0,88	60	50
50%	4H	4	110	547	558	20%	38%	26	1,41	0,72	60	40
Total Lift 3	7**				5.354 **					16,08		910

* not including off-piste terrain ** not including piste 4H

TABLE VII.3 – CONT.
GALIČICA
PISTE SPECIFICATIONS AT BUILD-OUT

Trail Name	Trail No.	Skill Class	Total Vert. [m]	Horz. Dist. [m]	Slope Dist. [m]	Slope Average [%]	Slope Steep. [%]	Ave. Width [m]	Horz. Area [ha]	Slope Area [ha]	Skiers At Area [ha]	Total
Lift 4												
	4A	5	250	615	664	41%	49%	36	2,20	2,37	45	110
	4B	4	323	1.080	1.127	30%	44%	32	3,50	3,65	60	220
	4C	6	238	585	632	41%	57%	34	2,00	2,16	22,5	50
	4D	5	336	970	1.027	35%	48%	31	3,00	3,17	45	140
	4E	4	125	490	506	26%	37%	37	1,80	1,86	60	110
	4F	4	237	842	875	28%	45%	26	2,20	2,29	60	140
	4G	5	240	785	821	31%	48%	26	2,05	2,14	45	100
50%	4H	4	130	550	565	24%	38%	25	1,40	0,72	60	40
Total Lift 4	8				6.212					18,36		910
MC1												
	6A	1	7	55	55	12%	12%	73	0,40	0,40	150	60
Total MC1	1				55					0,40		60
MC2												
	7A	1	4	35	35	10%	10%	57	0,20	0,20	150	30
Total MC2	1				35					0,20		30
MC3												
SNOWPLAY		1	2	20	20	8%	10%	25	0,05	0,05	150	10
Total MC3	-				20					0,05		10
Total All Lifts	**22**				**16 km**					**48 ha**		**2.530**

Two skiway (S1+S2) with an overall length of approx. 3,3 km are proposed in addition to the above listed ski pistes. The skiways were not considered in the overall skier capacity as they are not designed for return-cycle-skiing. Overall, the Master Plan of the Galičica Ski Center includes a total of 16 kilometers and 48 hectares of ski piste. The 22 pistes have an overall skier carrying capacity of 2.530 skiers per day.

.3.3.3 Piste Balance by Skill Class

As listed in Table VII.4 and illustrated in Plate VII.1 below, the piste balance by skill class is not ideally balanced. There is a significant shortage of low intermediate terrain and an excess of terrain for high intermediate skiers. This is because of the characteristic of the natural terrain of the Galičica Ski Center with relatively steep slopes except of the plateau at the mid-mountain area.

TABLE VII.4
GALIČICA
PISTE BALANCE BY SKILL CLASS AT BUILD-OUT
(Lift SCC = 3.000)

Skill Classification	Hectares	Skiers	Balance	Ideal
1 Beginner	1,6	240	9%	10%
2 Novice	5,3	390	15%	15%
3 Low Intermediate	2,0	120	5%	20%
4 Intermediate	11,3	680	27%	25%
5 High Intermediate	17,8	800	32%	15%
6 Advanced	10,2	230	9%	10%
7 Expert	off-piste	70	3%	5%
TOTALS	48,1	2.530	100%	100%

Average	62,3	Skiers / Hectare
Optimum	54,8	Skiers / Hectare
Weighted Demand	2.960	VTM / Skier / Day

PISTE BALANCE BY SKILL CLASS AT BUILD-OUT
GALIČICA

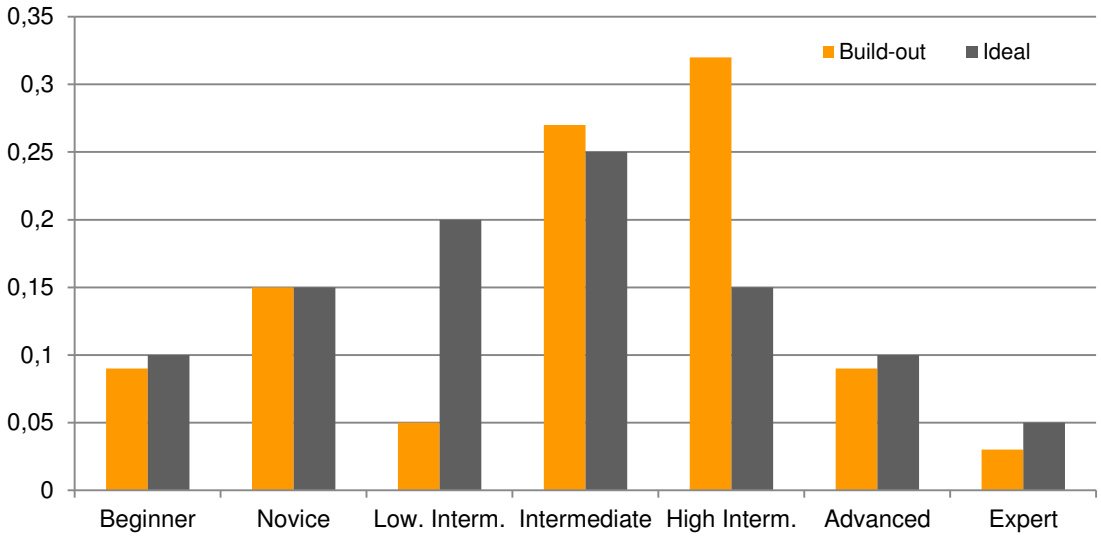
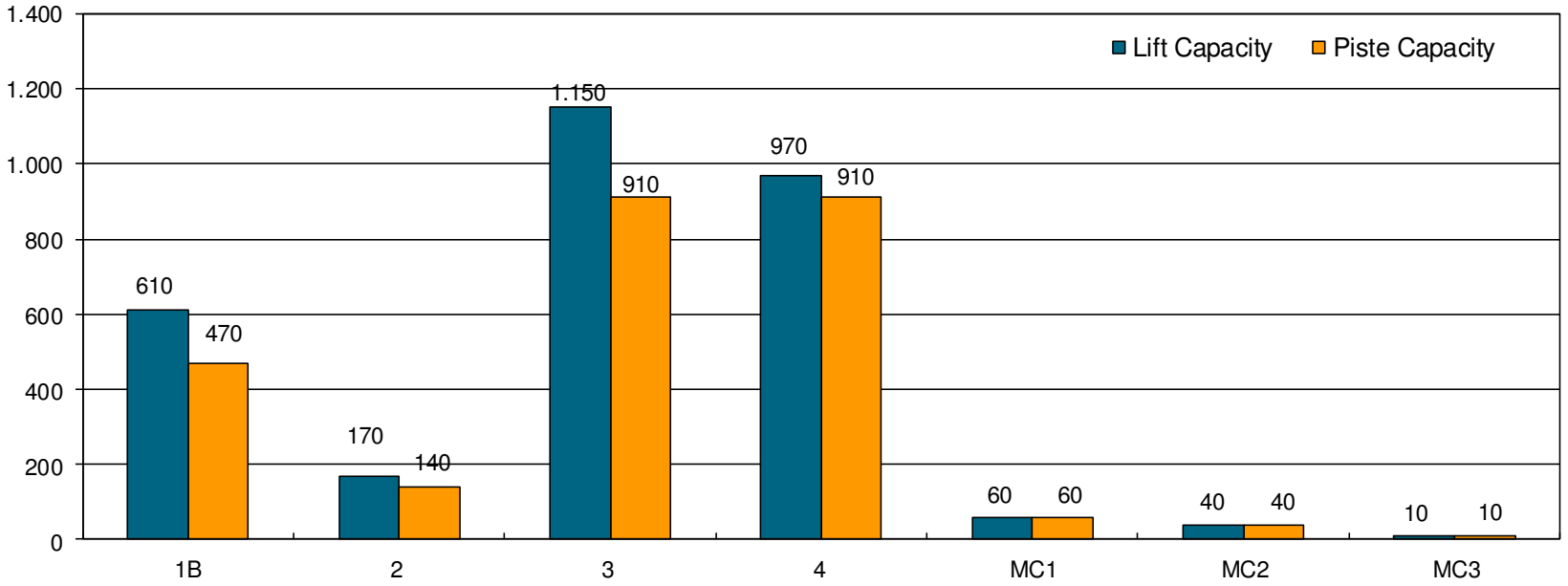


PLATE VII.1

LIFT VS. SKI PISTE CAPACITIES
BALANCE BY LIFT SYSTEM
GALIČICA AT BUILD-OUT
PLATE VII.2



As illustrated on the above plate VII.2, the capacities of the piste and lift systems are relatively well balanced. This is important to avoid long queues at the lift terminals or crowded ski pistes.

Optional add-on to the Galičica Ski Center Master Plan Concept:

Lift 5 – Oteshevo Connector

Lift 5 as illustrated on Fig. VII.1 is an optional access lift system connecting the Galičica Ski Center with the Lake Prespa side of the National Park.

This connection between the Lake Prespa side and the Galičica Ski Center **was formally requested by the client (Item 7 in Article 2 of Annex No. 1). Although we can confirm the technical viability of such a lift connection, we would like to point out that this is not something that we would propose. This mainly because of economic inefficiency of such an investment. Consequently this lift system is not an integral part of Ecosign´s Master Plan Concept. As an alternative to this access lift system, we would suggest considering to provide a road access from Oteshevo to the Central Plateau. The existing road could be redeveloped and used for guests arriving from the Lake Prespa side to access the *Galičica ski center.***

The bottom terminal of this lift is proposed near Oteshevo and the top terminal at the central plateau next to the bottom of Lift 5. The lift is exclusively for access to and egress from the ski area as the terrain and the low elevation do not allow any return-cycle skiing on this lift. Lift 5 is proposed as a detachable eight passenger monocable gondola with a rated capacity of 1.200 skiers per hour. This is an extensive ropeway system that spans over a horizontal distance of 4.703 meters and transports visitors 670 vertical meters starting from an elevation of 890 meters and ending at 1.560 meters above sea level. It will be a ride of about 15 minutes on the ropeway system from Oteshevo to the Central Plateau.

Eight-passenger gondola ropeway system

.3.3.4 Skier Staging Routes and Capacities

The staging and egress situation at the Galičica Ski Center is relatively straight forward considereing that there is only one proposed access opportunity . The idea is that all guests are using Lift 1A to get to the ski area.
Same situation applies for egress where skiers have to download the gondola to get back to their car, respectively their accommodation. No ski-out opportunity is included in the Galičica Ski Center Master Plans as the base areas are much too low in elevation and hence a ski out solution is not viable.

.3.3.5 Proposed Phasing

Ecosign proposes to split the implementation of such a project into several phases. For the Galičica Ski Area concept we suggest three phases with the lift installation sequence as listed below:

- **Phase 1**
  Phase 1 should include the access gondola (Lift 1) and the Beginner Zone (Lift 2, MC1, MC2 and MC3). Thie skier carrying capacity at Phase 1 will be 880 skiers per day.

- **Phase 2**
  In this Phase we suggest to build Lift 3 in order to expand the ski center to the east. With installation of Lift 3 the skier carrying capacity of the ski resort will go up to approx. 1.990 skiers per day.

- **Phase 3 (Build-Out)**
  By installing Lift 4 the ski area will reach the build-out capacity of 3.000 skiers per day

As mentioned earlier in this section, the Oteshevo Connector (Lift 5) is not a mandatory lift system for operation of the Galičica ski center. This access lift has only been integrated into the concept in order to meet the requirements listed in the Annex 1 to the Contract no. 02-4922/6. After a proper assessment of the situation, Ecosign advises against the installation of this lift mainly because of the poor cost-benefit ratio.

However, if this lift will be built in future then we propose to do it as a final act after build-out of the ski center. Furthermore, an extra beginner lift should be installed near the top of Lift 5 at the Central Plateau since if there will be people staging from the Lake Prespa side in future.

.3.3.6 Snowmaking

Due to periods with lower than ideal natural snowfall and the exposure of some pistes, snowmaking may be required to supplement the natural snowpack to ensure operation in the early and late season and to optimize snowpack during low snowfall years. Snowmaking can also be used to replenish snow when skier traffic wears down the snowpack.

The installation of snowmaking will ensure early and late season snowpack. For a ski area to open and stay open, with significant skier traffic, it is generally accepted that a ski piste requires a minimum of approximately 50 centimeters of packed snow over a fine-groomed summer surface in order to provide a quality surface for skiing and snowboarding. Less than this depth will result in the exposure of vegetation and rocks through the snow surface which can damage the vegetation and skiers' or snowboarders' equipment, as well as accelerate the melting of the snowpack. Ideally, the snowmaking system should first be able to make 50 cm depth of snow to open the ski area, but should also be able to make an equivalent of about 1 meter of snowpack to increase that base and maintain it at an adequate depth for the entire season (due to compaction, sublimation and evaporation). This supplemental snowmaking will ensure a long lasting, quality surface that will stand up to a large amount of skier traffic.

A ski facility with snowmaking normally opens the resort in stages, by making snow in different zones of the mountain during consecutive periods of time. The number of hours available for the first stage of snowmaking in the early season (from the late fall until the resort opens), is generally quite limited due to the climatic conditions, including both temperature and humidity.

A detailed analysis of the weather conditions by a snowmaking engineer will be required to determine the number of hours with conditions suitable to make snow over the course of the ski season. Furthermore it will be crucial to identify potential water sources for the snowmaking. We have not received any information about the amount of water available. Water supply is a critical subject for artificial snowmaking and considering the geological and climatic situation of the Galičica massive we believe that this will be a critical issue which needs to be studied in detail.

For Galičica ski center, we recommend having snowmaking installed on approximately 7 hectares of piste area in Phase 1 and 19 hectares of pistes at the build-out stage of development. Pistes with proposed snowmaking are illustrated on Fig. VII.2 Mountain Master Plan. Ecosign has also calculated the estimated water requirements for adequate snowmaking at the Galičica Ski Center. Table VII.5 shows the snowmaking coverage and the calculated water requirements for Phase 1 and for Build-Out. A snowmaking pond is proposed at an elevation of 1.870 meters. The ultimate capacity of the pond will depend on the snowmaking concept which needs to be done by a professional snowmaking company.

TABLE VII.5
SNOW COVERAGE AND WATER REQUIREMENTS FOR ARTIFICIAL SNOMAKING IN GALIČICA

Phase	Ski Trail Area [ha]	Opening Depth [cm]	Snow Volume [m3]	Water Required [m3]	Seasonal Depth [cm]	Snow Volume [m³]	Water Required [m³]
Phase I	7	50	35.000	19.250	100	70.000	38.500
Build-Out	12	50	60.000	33.000	100	120.000	66.000
Total	**19**		**95.000**	**52.280**		**190.000**	**104.500**

.3.3.7 Snowfencing

Supplemental to the proposed artificial snowmaking system, Ecosign recommends the installation of Snow Fences at wind exposed locations on the upper mountain. Appendix A provides guidance in order to support proper installation of such fences in the Galičica ski center. Proposed locations for snow fencing are illustrated on Figure VII.2 Galičica Ski Center - Mountain Master Plan. The final location of snow fences might need to be adjusted based on conclusions resulting in the analysis from on-site wind data which up to date have not been provided to Ecosign.

.3.3.8 Grooming Requirements

Ecosign has calculated the resulting number of required grooming machines based on the piste areas and piste classifications for Phase I and for the Build-Out, as listed in Table VII.6. Ecosign generally assumes that one fully operable grooming machine be available each nightly shift for every 20 hectares of groomable terrain in Classes 1-5 or for every 5 hectares per shift for Class 6 terrain. Class 6 terrain will not be groomed on a daily basis and we applied a grooming interval of 2, which means that on average, a Class 6 piste is groomed every second day. Off-piste areas and Class 7 terrain are not groomed and thus not included in the calculation. Based upon these criteria, the proposed grooming requirements were calculated as follows:

TABLE VII.6
GROOMING REQUIREMENTS FOR BUILD-OUT IN GALIČICA

Skill Class	Piste Area (ha)	Machine Coverage ([ha]/Machine/shift)	Machine Availability	Grooming Interval (Days)	Recommend # of Machines
Phase I					
Class 1-5	9,0*	20	80%	1	0,5
Class 6 (with Winch)	6,0	5	80%	2	0,8
Phase I TOTAL	**15,0**				**1,3**
BUILD-OUT					
Class 1-5	39,8*	20	80%	1	2,5
Class 6 (with Winch)	10,3	5	80%	2	1,3
BUILD-OUT TOTAL	**51,0**				**3,8**

* (incl. Skiways)

As shown in Table VII.6, one standard grooming machine plus one winch-equipped machine will be required in Phase I. A total of four grooming machines will be necessary to serve the trail system of the Galičica Ski Center at the build-out stage of development. Two out of the four grooming machines should be equipped with a winch.

Grooming machine with Winch

.3.3.9 Skier and Visitor Services

Skier and Visitor service facilities are those facilities which provide functions specifically related to the operation and management of the ski area, including facilities for non-skiers. For planning purposes, these services can generally be broken down into three distinct categories:

Staging Facilities - those services that are required as skiers and visitors arrive at the Ski Center.

Commercial Facilities - those services required throughout the day for all visitors (skiers and non-skiers) on the mountain and during après-ski hours.

Operational Facilities - those services not directly required by skiers but which are essential for the day-to-day operation of the Ski Center.

Staging facilities include ticket sales, public lockers, equipment rental and repair, ski school, and children's programs. These facilities are located in the base

area and should be sized in relation to the number of visitors staging through the base area.

Commercial facilities are located both in the base area and on the mountain and include food and bar seating, kitchen and serving areas, restrooms and accessory retail space. Restaurant space in the base area does not always need to be owned by the mountain operator; however restaurants on the mountain are normally the responsibility of the mountain operator. Restaurant seats should be planned relative to the number of skiers circulating in the vicinity of the proposed restaurant sites. Kitchens and restrooms must be sized in proportion to the amount of seating proposed for each restaurant.

Operational facilities are generally "back of the house" services and include administration, employee lockers and ski patrol facilities. These facilities are located both on the mountain and in the base area.

"Design Day"

To assist in the planning of service facilities at the Galičica Ski Center, the number of skiers and sightseers that are anticipated to be on the mountain on a "Design Day" needs to be determined. The design day is chosen to represent the average business levels expected during the high season. This is not the "Peak Day" experienced during the season, as if facilities were designed for the peak day, they would be very under-utilized for the majority of the season. The "Design Day" typically represents 80% of the combined buildout ski area SCC and estimate of the number of non-skiers that will use the facility. For the Galičica Ski Center, the design day has been determined based on 80% of 3.500 visitors (3.000 skiers and 500 non-skiers).

Ecosign has developed a skier service program for the Galičica Ski Center based on standards of recommended floorspace per visitor. In the second column of, Table VII.7. Ecosign's planning standards for the amount of skier service space recommended per skier for each of the 12 skier service functions at a typical Day Skier Area are listed. These standards have been developed over several years and incorporate data from resorts in Europe, North America and Asia. The Theoretical Recommended floorspace per skier is applied to the "Design Day" visitor capacity of 2.800 visitors to determine the total recommended floor space for each of the 12 skier services, as well as storage and circulation space within a building.

Four buildings have been planned as part of the master plan for the Galičica Ski Center; the Base Area Lodge, Mid-Mountain Lodge, Mountain Top Lodge and the Backside Lodge. Table VII.7 outlines the total recommended floor space for each of the 12 skier services, and a breakdown of the allocation of services between the four buildings. Staging facilities are planned in both the Base Lodge and the Mid-Mountain Lodge, while commercial and operational facilities are spread through all four buildings.

TABLE VII.7
GALIČICA SKI CENTER
SKIER SERVICE PROGRAM

Buildout SCC + 500
Sightseers **3.500**
Design Day Capacity (80%) **2.800**

Guest Service Function	Theo. Recomm. m²/skier	Recomm. Floor Space m²	Base Area Lodge	Mid-Mountain Lodge	Mountain Top Lodge	Backside Lodge	Total Buildout
Staging Facilities							
Ticket Sales	0,09	252	252,0	-	-	-	252,0
Public Lockers	0,04	112	-	112,0	-	-	112,0
Equipment Rental & Repair	0,075	210	105,0	105,0	-	-	210,0
Restrooms for Staging	0,02	56	56,0	-	-	-	56,0
Guest Services/Snow Sport School	0,02	56	28,0	28,0	-	-	56,0
Children's Programs	0,02	56	-	56,0	-	-	56,0
Staging Subtotal	**0,265**	**742**	**441,0**	**301,0**	**-**		**742,0**
Commercial Facilities							-
Food & Beverage Seating	0,4	1.120	56,0	448,0	403,2	224,0	1.131,2
Kitchen & Scramble	0,15	420	21,0	168,0	151,2	84,0	424,2
Restrooms	0,08	224	11,0	89,6	67,2	56,0	223,8
Accessory Retail	0,05	140	20,0	100,0	10,0	10,0	140,0
Commercial Subtotal	**0,68**	**1.904**	**108,0**	**805,6**	**631,6**	**374,0**	**1.919,2**
Operational Facilities							-
Administration	0,025	70	35,0	17,5	17,5	-	70,0
Employee Facilities	0,02	56	28,0	14,0	14,0	-	56,0
First Aid & Mountain Patrol	0,02	56	-	19,0	19,0	19,0	57,0
Operations Subtotal	**0,07**	**182**	**63,0**	**50,5**	**50,5**	**19,0**	**183,0**
Total Net Functional Space	**1,01**	**2.828**	**612,0**	**1.157,1**	**682,1**	**393,0**	2.844,2
Storage (10%)	0,1	283	61,2	115,7	68,2	39,3	284,4
Mechanical/ Circulation/ Walls/ Waste	0,15	424	91,8	173,6	102,3	59,0	426,6
Total Building Floorspace	**1,260**	**3.535**	**765,0**	**1.446,4**	**852,6**	**491,3**	**3.555,2**

Base Area Lodge

The Base Area Lodge is located directly adjacent to the Lift 1a gondola bottom terminal (Figure VIII.7) on the east side of P1. This building provides the majority of the ski area's staging functions, as well as some commercial and operational facilities. Due the easy access and reduced construction costs for the Base Area Lodge relative to the on-mountain Lodges, some of the facilities that are typically provided on the mountain have been partially allocated to in this building. Ticket facilities, restrooms, guest services, rentals (50% of total), a café, small retail shop, office space and employee space has been planned in the Base Area Lodge. This building is designed on one level and connects with the gondola terminal building and chair storage. The main entrance is on the east side of the building adjacent to the drop-off area with a secondary entrance on the south side of the building. The Base area lodge is visible from the entrance to P1 and provides all the services necessary for visitors to start their day at Galičica Ski Center.

Mid-Mountain Lodge

The Mid-Mountain Lodge is the largest building planned within the ski area facility and is envisioned as the main "Day Lodge" for skiers and non-skiers. Facilities planned within the Mid-Mountain Lodge include rentals, lockers, ski school, children's programs, a cafeteria style restaurant, restrooms, a retail shop, ski patrol space, employee space and some office space. The building has a total gross floor area of 1.500m² which is planned over two full floors. Figure VIII.8 illustrates the location of the Mid-Mountain Lodge in relation to the gondola mid-station and other facilities in the Mid-Mountain Zone. The lodge has been located central to the beginner ski area, tubing zone and snow play facilities so guests can easily access all of the activities that are offered in the mid-mountain zone from the Lodge. The entrance to the lodge is located 125m to the west of the gondola loading platform on a level path that follows the upper edge of the beginner zone. The restaurant is planned on the second level of the building which creates an opportunity for a sunny patio with views of the ski terrain and Lake Ohrid on the south side of the building. A second outdoor seating area with a fire pit is planned at the base of the tubing hill which would provide a viewing area for tubing and the beginner area. From the Lodge, a pedestrian path extends to the west to a snow play and activity zone which could include a sledding area, children's ski area with walk-up carpets (non-mechanical), a mini-snowmobile track for children and a series of snow-related play toys for kids. Circulation between the gondola mid-station, Mid-Mountain Lodge and activity zones is designed with a hard surface for pedestrians as well as a snow surface for skiers or a potential snowmobile shuttle from the lodge to the snow play zone on the north side of the site (200m from the lodge).

Mountain Top Lodge

The Mountain Top Lodge is illustrated in Figure VIII.9. The Lodge is connected to the top of Lift 1b to allow pedestrians to enter the building directly from the off-load zone and in order to utilize the gondola to transport food and waste in and out of the restaurant. The Mountain Top Lodge has two levels; the main level is at the same elevation as the gondola and snowfront while the lower level can be accessed from the west side of the building from snow at lower elevation. The main level includes food service seating, kitchen and scramble and a small retail shop. Restrooms, storage, ski patrol space, employee space and a small office is planned for the lower level. The Mountain Top Lodge has a large south-facing patio overlooking Lake Ohrid to the west and Lake Prespa to the south east.

Backside Lodge

The Backside Lodge includes a restaurant, restrooms and a small ski patrol space located at the bottom of Lift 3. The Backside Lodge could be considered for summer use by hikers and would also be used by Nordic skiers if the proposed cross-country trail network is developed. The Backside Lodge is illustrated in Figure VIII.10.

.3.3.10 Food Service Seating

Indoor food service seating has been programmed for the Design Day capacity of approximately 2,800 visitors which includes skiers and non-skiers. The capacity of food service establishments to provide lunch and other snacks to skiers is calculated by assuming a typical turnover of 3 people per seat. A total of 943 seats have been planned within the four buildings included in the Galicica Ski Center Master Plan. Table VII.8 provides a summary of the food service capacity of the Ski Center.

The Mid-Mountain Lodge has the largest restaurant capacity with 373 indoor seats which can serve a total of 1.120 guests at three turns per seat. The restaurant in the mid-mountain lodge is envisioned as a cafeteria style restaurant with a large “scramble” zone where guests can choose from various meal options. An outdoor BBQ is also a possibility for the patio space on the south side of the mid-mountain lodge.

A smaller café-style food service venue is envisioned for the Base Area Service Building, with a total of approximately 50 indoor seats. This café will provide coffee and snacks to visitors during the morning staging period and at the end of the day. It is not anticipated that skiers will eat at the Base Area Service Building for lunch in the middle of the ski day.

The Mountain Top Lodge will be constructed with a capacity of 336 indoor seats. This restaurant will be open during the summer season and will be a primary draw for sight-seers, hikers and other non-skiers.

The Backside Hut is planned for Phase 3 at the bottom of Lift 3 with a capacity of 187 seats.

TABLE VII.8
GALIČICA SKI CENTER
FOOD SERVICE SEATING PROGRAM

	No. Indoor Seats	No. Turns per Seat	No. Guests Served
Base Area Building	47	3	141
Mid-Mountain Lodge	373	3	1.119
Mountain Top Lodge	336	3	1.008
Backside Hut	187	3	561
Total	**943**		**2.829**

.4 Summer Use Concept

Summer recreation activities are extremely important for the success of the resort year-round and for creating an environment that attracts investors in the real estate development. These can be activities that make use of the infrastructure and facilities already in place for winter recreation, as well as other recreational amenities which add diversity to the overall resort. There should be a wide range of activities to attract guests to the ski area and provide them with a memorable, enjoyable and entertaining visit.

The design of the Galičica Ski Center was remarkably driven by the goal to develop a year-round tourism attraction. The pristine beauty and the natural diversity of the Galičica National Park are a valuable and unique setting for such a tourism project. Also the fact that there is a considerable amount of existing tourism in the region constitutes a great situation and a significant advantage when developing a new tourism product like the Galičica ski center.

The recreation concept for the Galičica Ski Center is presented on Figure VII.4, Galičica Ski Center Summer and Winter Recreation Plan. This plan illustrates which summer or winter recreational activities are suggested on the mountain besides of alpine skiing. The mid-mountain zone and of course the mountain top area are the centers for such activities offering various kinds of activities for different target groups.

The proposed leisure activities can be categorized into following groups:

Nature Experience

- Lift Accessed Sightseeing and Hiking
- Nature Interpretive Hikes
- Mountain Cinema
- Snowshoeing
- Nordic Skiing
- Camping
- Mountain Biking

Action

- Zip Line
- Climbing Wall
- Paragliding/Hang Gliding
- Euro Bungee Trampoline

Events

- Conference, Seminar, Wedding

Family

- Children`s Activity Zone
- Children´s Skidoo Course
- Snow Tubing

Nature Experience

Lift Accessed Sightseeing and Nature Interpretive Hikes

One of the most popular summer activities at a mountain resort is lift-accessed sightseeing and hiking in the alpine. The gondola cabins can be used in the summer to transport pedestrians to the alpine environment where they can experience spectacular views and hikes.

The hiking program can be expanded to include nature interpretive hikes, with staff from the Galičica National Park assisting in guiding and educating guests. Highlights of the tours will include the identification of local wildlife, flora and fauna. Indoor and outdoor interpretive displays can also be installed in and around the mountain top restaurant/lodge facilities. Lift-accessed sightseeing and hiking is a great way in which a mountain resort can effectively take advantage of their lift system in the summer season and offers a satisfying and inexpensive guest experience.

Typically, the mountain restaurants at the top of summer-operated lifts are open in the summer, allowing visitors the opportunity to spend a day at the top of the mountain. Wild flowers, alpine lakes, wildlife, views, evening-star gazing and trails are popular attractions for guests accessing the alpine in the summer.

Mountain Hiking during Alpine Blossom Season

Mountain Top Nature Interpretive Center, Restaurant and Sightseeing Area

Mountain Cinema

From the mountain top there is a spectacular view tot he surrounding mountains as well as to the two big lakes to the east and to the west. Thus there are several spots predestinated for a Mountain Cinema.

In a Mountain Cinema the landscape and the surround nature take the role of the screen. It invites to pause for a while and to experience and preceive nature with all physical senses.

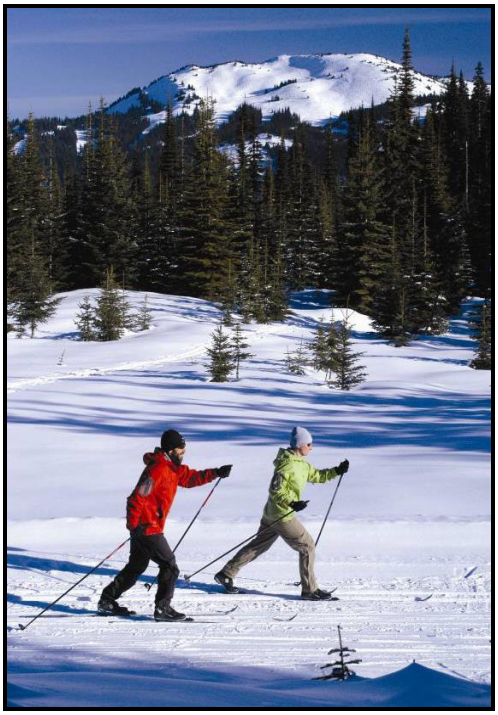
Snowshoeing

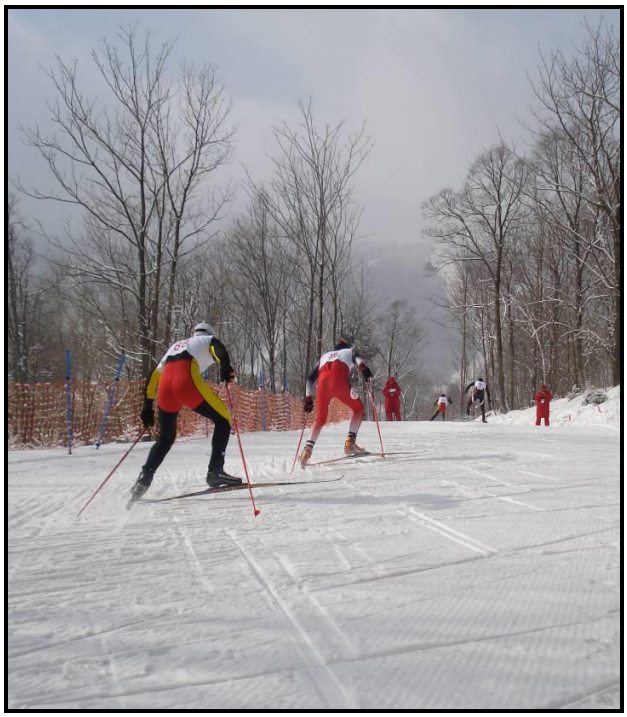
Snowshoeing is a popular winter resort activity for all ages and abilities which can be offered on a trail network with starting points either at the mid-mountain or starting from the mountain top. Snowshoeing can take place off the track but also on summer hiking or biking trails, allowing year-round use for trail facilities.

Snowshoeing

Nordic Skiing / Cross-Country Skiing

Nordic / Cross-country ski trails can be developed on gentle terrain that is too flat for commercial skiing. Ideally, the cross-country ski trails are easily accessible from the lift terminals. For the Galičica Ski Center we propose Nordic skiing to the north of the mid-mountain zone on the Lake Ohrid side as well as at the Central Plateau at the top of Lift 5.





Skate Skiing Competition

The cross-country trail network can be maintained by the staff of the ski center and the mid-mountain lodge and skier services there can be used by Alpine and Nordic skiers. Cross country ski trails can be used by Skate skiers and Nordic skiers alike and are typically 6m wide to allow for two-way circulation. The development of extensive Nordic facilities creates a secondary venue for competitions at the ski center and can contribute to attracting a broader range of resort guests.

Mountain Biking

Mountain bikers can utilize Lift 1, the Gondola to access the mountain or they can ride the pass road to the Central Plateau and from there further up to the highest point. We propose mountain biking on existing paved and gravel roads but also to build some new single trails dedicated for bikers.

Mountain biking on single trails and grave roads

Action

Zip-Line

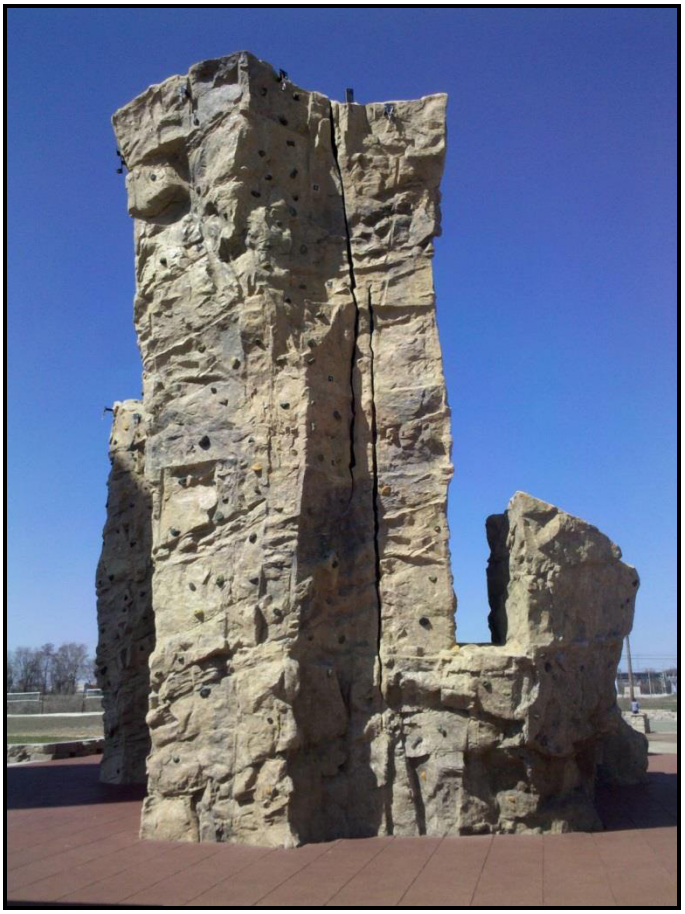
Zip- Lines are becoming very popular at resorts around the world. A Zip-Line is basically a cable that is mounted on an incline with a carriage, with one or more pulleys that travel down the cable and a seat attached to hold a passenger. Passengers load the Zip Rider at the high point of the Zip Line and travel down the line at speeds up to 80km/hr. The system has a self-braking device so that passengers do not accelerate beyond the design speed and slow down at the end of the ride. Zip Riders can be installed in a variety of terrain with an overall grade of up to 40%.

A Zip-Line cable could for example be installed starting from the top station of Lift 1 going down and crossing the proposed snowmaking pond to the south-east. Then after a short hike another Zip-Line could be installed to bring passengers back to the starting point on the rope.

Zip-Line system

Climbing Wall

Climbing walls are very popular at ski /snowboard resorts. These are usually free standing structures that are modular and set up for the summer. A climbing wall is proposed at the mid-mountain zone of the Galičica Ski Center



Modular type Climbing Wall

Paragliding/Hang Gliding

Paragliding is possible from south-facing slopes in some mountain environments. This sports is already very popular in the Galičica National Park. In future the ski area's lift system can be used to allow paragliders to access a high-elevation launch area.

Paragliding

Euro Bungee Trampoline

The Bungee Trampoline has become very popular at ski and snowboard resorts around the world and can be used both during the summer and winter. The Slingshot Trampoline Bungee Jump provides a safe and fun way for the entire family to experience “big air” in the mountains.

Jumpers are able to reach heights that would be impossible using a trampoline alone. Secured and safe in an adjustable purpose built harness, jumpers are free to experiment with acrobatic movements or simply jump as high as they can. This exciting activity combines the adrenaline rush of a trampoline and bungee jumping in a safe and controlled environment and is very popular for spectators. This piece of equipment could be located on the mid-mountain or at the mountain top both during the summer and winter if desired.

Bungee Trampoline

Events

Conferences/Seminars/Weddings

The presence of a large hotel bed base and activities makes a mountain resort the ideal location for hosting conferences, seminars, retreats, family reunions, weddings and other group activities associated with these gatherings, as long as facilities exist to support such events. Therefore, a conference center is a critical element in mature destination resort villages. The conference center can attract groups, organizations and events to the resort which can contribute significantly to the summer economy. Ideally it is a flexible space that can be used for a wide variety of events that can ultimately add to a destination mountain resort's competitive edge. We suggest to host such events at the mountain top building.

Family

Children's Activities Zone

Several Children's Activity Zones have been dedicated in the Galičica Ski Center Master Plan, one at the mid-mountain, the mountain top and another one at the top of Lift 1. Temporary structures in these areas during the summer months, offering a wide variety of activities including bungee trampoline, climbing wall, mini golf, go-karts, bouncy castle, pony rides etc. The summer activity zones utilize the gentle terrain of the winter snow play areas and help to draw visitors to the retail and restaurants within the resort village during the summer season. Activities usually do not require any specific skills and are offered at a relatively low cost which makes these areas extremely popular for visitors to the resort.

Euro Bungee Trampoline

Playground

Free Standing Climbing Wall

Climbing Structure

Kart Track set up on hard surface of Skier Plaza

Children's Mini-Z's

It is proposed that a Mini-Z snowmobile track for children and families be constructed at the mid-mountain zone so that it is conveniently located for guests. The mini-z's only require the area equivalent top two tennis courts for a "closed circuit" track for children.

Children's Mini Z's

Snow Tubing

A Snow Tubing area is proposed at the mid-mountain zone of the Galičica Ski Center. Other than skiing and snowboarding, snow tubing is becoming a very popular activity at winter resorts. The following section outlines tubing operations at other world class winter resorts. Kids of all ages will enjoy the thrill of snow tubing. Tubing requires no special skills or athletic abilities to participate, making it suitable for almost everyone. Tubes and riders are transported uphill by a mechanical lift, whereupon they choose a tubing lane and begin their ride. Lanes are groomed for various experiences and skill levels.

At the top of the tubing lanes there is a start area where tubers prepare themselves for launching down the tube lanes. Normally, a starter attendant gives the signal for the tubers to start when the lane is clear of tubers below. The starting/acceleration zone is usually around 25 percent slope gradient for 15 to 30 feet of vertical drop. Each lane is shaped with a slight depression in the center and a berm on each side to keep the tubes within their respective lanes. As the tube rider progresses down the tube lane, the slope gradient decreases. The bottom of the lane has a flat run-out and deceleration zone that may even include a slight counter-slope area to slow down and then stop the tubes. The average gradient between the start zone and the stopping point of the tubes is approximately 12-15 percent, depending on the types of tubes used. For the Galičica Ski Center a snow tubing area is proposed at the Mid-Mountain Zone.

Carpet Tubing Lift and Tube Slope

.5 Base Area Land Use Concept

.5.1 Base Area Planning Parameters

Mountain resort base area development includes access roads, overnight accommodation, commercial space, day-use parking and pedestrian circulation space. The base area interfaces the alpine ski area development and serves as a staging portal for all summer and winter recreation activities. Day visitors arrive at parking lots in the base area from various modes of transportation such as private vehicle, regional bus or local public transportation from where they walk to the main staging lifts and service center. Visitors staying in overnight accommodation in close proximity to the base area will walk or take a hotel shuttle to reach the main staging lifts to start their day at the ski center. The base area land use plan is developed with the objective of maximizing all available developable land within walking distance from the main staging lifts to minimize the need for secondary internal modes of transportation. Base area planning parameters are utilized to determine capacities and the overall development program of proposed parking (Day Visitors) and accommodation (Overnight Visitors) parcels that make up the base area land use plan. The capacities of parking and accommodation are estimated using base area planning parameters to ensure that the base area capacity and mountain capacity are balanced at each development phase of the Galičica Ski Center Master Plan.

Planning Parameters - Accommodation

Table VII.9 outlines the land use designations related to various types of accommodation included in base area land use plan for the Galičica Ski Center. Three designations identify different accommodation development types with a range of bed densities (beds per hectare), as shown in Table VII.9.

TABLE VII.9
ACCOMMODATION LAND USE PLANNING PARAMETERS

Land Use Designation	Units/ha	Beds/ha	Beds/Unit
SFU	13	80	6
Apartments/Multi-Family Units	50	200	4
Hotel/Village	200	400	2

An estimate of the number of beds generated from proposed accommodation parcels is made by applying the assumptions illustrated in Table VII.9 to the area (hectares) of a given proposed development parcel. The three accommodation land use designations are described in detail below.

Single-Family Units

Single-Family Units (SFU) development is defined by privately owned detached units. Depending on the parcel size, the units can vary from simple ski cottages to extravagant homes. Single family units are typically proposed on steeper terrain unsuitable for higher density development, as this development type has a relatively small footprint which requires less earthwork.

Single Family Unit / Chalet

Apartments / Multi-Family Units

The Apartments land use designation describes multi-family overnight accommodation in buildings up to 4 floors with no commercial space. Units can be walk-up or accessed by a central hallway and the building may have a small lobby and shared amenity space. Apartment units are typically privately owned, second home real estate that is managed by a rental company so that the unit is available for use by other guests when it is not in use by the owner.

3,5 floor Apartments

Hotel / Village

The Hotel/Village land use designation is planned within walking distance from the main staging lifts and includes a mix of accommodation, commercial space and other tourist amenities. The Hotel/Village land use designation has the highest density of overnight accommodation (400 beds per hectare) and is typically developed with smaller units with an average of 4 beds per unit.

Areas designated as Hotel/Village are mixed-use development that allow for a combination of both commercial and residential product in each building. Typically, building height is limited to 4 to 5 floors and the ground level is reserved for non-accommodation uses such as commercial space, amenity space, lobby or back of house space. Pedestrian plazas and shopping streets are an essential component of the Village land use and provide an animated experience for guests before and after the ski day, as well as activities for guests who choose not to ski. The Hotel/Village zone should be connected to other summer and winter recreation facilities.

Summer Mountain Village

Accommodation Occupancy

Occupancy assumptions are applied to the land use plan program for accommodation parcels to estimate the overall number of visitors that will be generated from various types of accommodation during peak periods. Furthermore, the number of skiers from accommodation is estimated based on a Skier Participation rate. Occupancy rates vary significantly between beds in private real estate units and hotel units therefore two sets of assumptions are applied, as shown in Table VII.10. An estimate of visitors and skiers generated from accommodation within walking distance to the main staging lifts is an important component of the overall base capacity calculation. Visitors from accommodation outside of walking distance will access the resort by private vehicle or bus and are considered as "Day Visitors".

TABLE VII.10
ACCOMMODATION
OCCUPANCY ASSUMPTIONS

Land Use Designation	Unit Occupancy	Bed Occupancy	Visitor Yield	Skier Participation	Skier Yield
Hotel (Public Accommodation)	70%	70%	49%	60%	29%
Apartments, SFU, MFU (Private Real Estate)	20%	50%	10%	50%	5%

Planning Parameters - Parking

Table VII.11 outlines the planning parameters and assumptions related to parking that are applied in the Galičica Ski Center base area land use plan. These assumptions are used to estimate the capacity and visitor yield from proposed parking lots during peak periods.

TABLE VII.11
ASSUMPTIONS - PARKING

Cars Per Hectare	330
Visitors from Cars	2,7
Buses Per Hectare	70
Visitors from Buses	40

Comfortable Walking Distance

The spatial relationship between the staging lifts, accommodation and parking is important as visitors originating from accommodation or parking beyond comfortable walking distance of the access lift terminals either require some form of vehicular transportation to the lifts, or face a long walk at the beginning and end of the day. This requirement for transportation between accommodation and staging lifts results in traffic and parking demands throughout the base area. Comfortable walking distance is defined as a 500m radius for base areas that are situated below the snow line and for ski centers where the majority of visitors rent equipment and will not be walking in ski boots.

Comfortable Walking Distance is a determining factor for the location of the bottom terminal of the staging lifts, as all parking and as much accommodation as possible should be located within walking distance from the lift to create a truly pedestrian oriented development. A graphic indicating the extent of Comfortable Walking Distance is illustrated on the Base Area Land Use Plans for the Galičica Ski Center Master Plan.

.5.2 Base Area Land Use Plan – Lake Ohrid

The Base Area Land Use Plan for the Lake Ohrid side of the Galičica Ski Center is presented in Figure VII.3a. The ski center's main staging area, day visitor parking and overnight accommodation is located in a new proposed base area located between 830m and 900m in elevation to the south of the existing village of Peštani. This base area development zone has been named the "Upper Peštani Base" and can be accessed from the future highway between Ohrid and the border with Albania.

A second base area development zone, the "Gradište Lakeside Village", is identified in Figure VII.3a on the north side of the Gradište peninsula. The Gradište Lakeside Village is located roughly 2km south of the "Upper Peštani Base" and is therefore disconnected from the Ski Center's base area development. However, the Gradište Lakeside Village offers an attractive development opportunity due to its location adjacent to the shore of Lake Ohrid and has been included in the master plan to add value to the overall development package. The Mid-Mountain Zone is also illustrated in Figure VII.3a and is described in detail on page 53 of this report.

Views to the north from the west side of Parcel P1 in the Upper Peštani Base

Table VII.12 provides a summary of the proposed development parcels included in the land use plan for the Upper Peštani Base and Gradište Lakeside Village. A total of 13 parcels, 18,8 hectares of land and 2.300 beds are included in the land use plan for the Upper Peštani Base. The Gradište Lakeside Village development zone overall includes 9,6 hectares of land in two parcels which could generate 1.600 beds.

Views of the Gradište peninsula to the south from Parcel 13 in the Upper Peštani Base

TABLE VII.12
GALICICA SKI CENTER
BASE AREA LAND USE PLAN
LAKE OHRID

Parcel	Area ha	Land Use Designation	No. Beds
LAKE OHRID			
Upper Peštani Base			
P1	1,8	Parking & Drop Off	n.a.
P2	0,5	Parking & Drop Off	n.a.
P3	0,7	Parking & Drop Off	n.a.
1	0,4	SFU	32
2	0,65	SFU	52
3	0,7	SFU	56
4	2,1	SFU	168
5	1,5	SFU	120
6	1,0	Apartments	200
7	0,55	Apartments	110
8	0,4	Apartments	80
9	0,6	Apartments	120
10	3,0	Hotel (Mountain Village)	1.200
11	2,1	SFU	168
12	2,5	Service Center/Staging Area	n.a.
13	0,25	Picnic Area	n.a.
Subtotal Upper Peštani Base	**18,8**		**2.306**
Gradište			
14a	1,0	Hotel (Lakeside Village)	400
14b	6,0	Apartments	1.200
14c	2,6	Public Green Space	-
Subtotal Gradište	**9,6**		**1.600**
TOTAL LAKE OHRID	**28,4**		**3.906**

Upper Peštani Base

The Upper Peštani Base is planned at the base of Lift 1a, the only year round access to the Galičica Ski Center's four-season recreation facilities. This site was identified in the base area development analysis due to the large area with gentle slopes suitable for development and potential connection to the future highway (see Figure VI.10a Parcel LO-1 & LO-2). The Upper Peštani Base has excellent views of Lake Ohrid and its eastern shore, as wells as the mountains in Galičica National Park and future ski center development.

The Upper Peštani Base has been designed to maximize day visitor parking for the ski area to ensure that the buildout capacity of the base area is in balance with the buildout capacity of the recreation facilities. A real estate and mountain village component has also been included in the Upper Peštani Base Area development to capitalize on the increased land value in areas adjacent to the gondola and to diversity the overall master plan package. Parking lots and the gondola terminal are located at the lowest elevation within the base area development to ensure that day visitor traffic does not conflict with circulation within the real estate and village development. Three parking lots with a total area of 3,0 ha are accessed by 1.000m of proposed road from the future highway. The parking lots have a capacity of 935 cars and 12 buses which could generate approximately 3.000 visitors during peak periods, as shown in Table VII.13.

TABLE VII.13
UPPER PESTANI BASE
PARKING CAPACITY

Parcel	Area ha	Land Use Designation	Cars per ha	No. Cars	No. Buses	No. Visitors
P1	1,8	Surface Parking	330	594		1.604
P2	0,5	Surface Parking	330	165		446
P3	0,7	Surface Parking	330	176	12	955
Total	**3,0**			**935**	**12**	**3.005**

A building is planned adjacent to the gondola terminal to provide essential services for visitors in the base area before they load the gondola. The main drop off zone for vehicles will be located adjacent to this building within the parking lot parcel. A picnic area is identified on the west side of Parcel P1 to provide an amenity for visitors with views to the lake. The detailed layout of the parking and base area facilities planned in the Upper Pestani Base is illustrated in Figure VIII.7.

Parcel P1 looking south

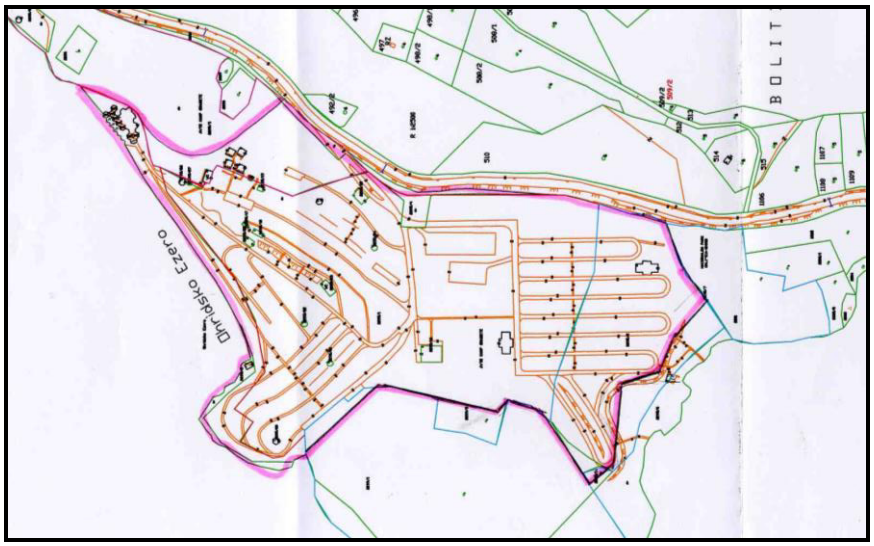
Parcels 1 to 11 identify the real estate and mountain village development zone in the Upper Peštani Base. This area is accessed beyond the day visitor parking area with 2,2 km of proposed road that climbs to an elevation of 900m. The mountain village is located on a flat plateau at 885m overlooking Peštani village and Lake Ohrid. This development is envisioned as a cluster of hotels surrounding pedestrian areas that connect to the gondola terminal and surrounding hiking trails. The mountain village could feature a spa, retreat center, conference facilities or other amenities that would attract groups looking for a quiet mountain setting for an event or function. A mix of commercial space accessible to the public such as restaurant and retail space should also be integrated into the mountain village.

Views to Lake Ohrid from Parcel 10 Mountain Village

A private real estate component with a mix of single family units and multi-family apartments is planned surrounding the Mountain Village and upper slopes. Parcels 1, 2, 3, 4, 5 and 11 are designated as low density single-family units. This development should be carefully integrated into the landscape with as much natural vegetation preserved as possible. Parcels 6, 7, 8 and 9 are designated for medium density apartments that would have views and a good connection to the mountain village.

Gradište Lakeside Village

The Gradište Lakeside Village has been included within the Galičica Ski Center Master Plan as a potentially profitable component of the plan that could help to offset the large capital cost of the ski center facility. Currently, several tourist facilities are located on the Gradište peninsula including a museum, a historical site and an extensive caravan park and camping area. Ecosign was provided with a map of Gradište showing the area of land within the existing caravan park that is owned by the federal government of Macedonia outlined in pink (below). Assuming that the government can cede the land in this area in cooperation with the Gradište Ski Center development project, the Lakeside Village Parcels 14a, 14b and 14c are proposed within state-owned land. The overall Gradište development includes a hotel component, an apartment (private real estate) component and public green space which should be designed in an integrated manner with the surrounding tourist facilities. The total area of parcels 14a, 14b and 14c is 9,6 hectares which could generate approximately 400 hotel beds, 1.200 beds in apartment units and 2,6 hectares of public green space.



Property boundary map provided by MEPSO. Available land for a lakeside village highlighted in pink.

The connection to the lake is the strongest asset for the Lakeside Village. This development should be master planned in detail to allow for public circulation through the village zone to the lake with pedestrian connections to other tourist facilities in the area. Visitors staying in overnight accommodation in the lakeside village will drive or take a shuttle to the Upper Peštani Base to access the Galičica Ski Center facilities year round.

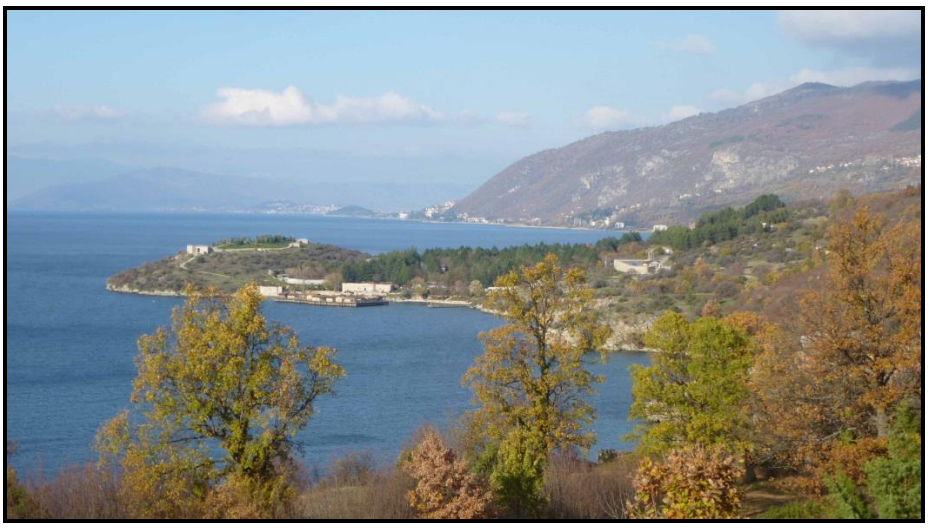
The Gradište peninsula looking south

Table VII.14 provides a summary of the accommodation mix proposed for the Upper Peštani Base and Gradište Lakeside Village. The planning parameters outlined in Tables VII.9 and VII.10 have been applied to the parcel areas to estimate number of beds, units and visitors from accommodation during peak periods. The Upper Peštani Base includes a total of approximately 2.300 beds which translates to 827 units, the majority of which are in the Mountain Village. At peak occupancy, it is estimated that approximately 700 visitors to the Galičica Ski Center could be generated from this development. Only Parcels 4, 5 and 6 are outside of the 500m comfortable walking radius, therefore it is expected that most visitors will walk to reach the lifts.

The Gradište Lakeside Village includes a total 1.600 beds which is equivalent to 200 hotel units and 300 apartment units. Visitors generated from these beds will access the ski center by vehicle and are therefore considered as day visitors in the parking capacity calculation.

TABLE VII.14
ACCOMMODATION MIX
UPPER PESTANI BASE

	No. Beds	% Total Beds	No. Units	% Total Units	No. Visitors
Upper Peštani Base					
SFU	596	26%	99	12%	60
Apartments	510	22%	128	15%	51
Hotel (Mountain Village)	1.200	52%	600	73%	588
Subtotal Upper Peštani Base	**2.306**	**100%**	**827**	**100%**	**699**
Gradište Lakeside Village					
Hotel (Lakeside Village)	1.200	75%	300	60%	-
Apartments	400	25%	200	40%	-
Subtotal Gradište	**1.600**	**100%**	**500**	**100%**	
TOTAL LAKE OHRID	**3.906**		**1.327**		



Gradiste peninsula looking north

Base Capacity

"Base capacity" is defined as the capacity by which parking lots and accommodation can generate visitors for the Ski Center. The base capacity needs to be planned to match, or balance, with the capacity of the alpine ski area to ensure that planned facilities will be occupied to their comfortable carrying capacity at the buildout phase of the development. As listed in Table VII.2 the buildout Skier Carrying Capacity of the alpine ski facility at the Galičica Ski Center is 3.000 skiers at one time. In addition, the Mid-Mountain Zone has capacity for approximately 500 non skiers that will participate in snow play, snow sliding, Nordic skiing or will simply be sightseeing on the gondola. As non-skiers tend to spend less time at the Ski Center, it is expected that there will be turnover throughout the day and the total number of sightseers during peak periods could be up to 1.000 visitors.

Table VII.15 provides a summary of the balance between the Upper Peštani base capacity and the mountain capacity. Ecosign estimates that 500 visitors from the Upper Peštani Base accommodation will walk to the gondola terminal (70% of the total estimate of 699 visitors in Table VII.14). The total parking capacity as shown in Table VII.13 is 3.005 visitors which results in a total base capacity of 3.505 visitors. This is in balance with the total mountain capacity of 3.500 visitors.

TABLE VII.15
BASE CAPACITY
UPPER PESTANI BASE

	No. Visitors
Visitors from Accommodation	500
Visitors from Parking	3.005
Total Upper Peštani Base Capacity	**3.505**
Buildout SCC	3.000
Sightseers/Snow Players/Nordic	500
Total Mountain Capacity	**3.500**

.5.3 Base Area Land Use Plan – On Mountain

Several land development parcels have been identified within the mountain recreation zone of the Galičica Ski Center in three zones; the Mid-Mountain Zone, Mountain Top Zone and the Central Plateau Zone. The land use parcels in these zones are illustrated in Figures VII.1, VII.2 and VII.3a. Table VII.16 outlines the area and land use designation for the seven on mountain development parcels. The land use designations for these areas include on-mountain lodges and area for supporting winter and summer recreation facilities. No additional guest accommodation or parking is planned within the on mountain zones.

TABLE VII.16
ON MOUNTAIN LAND USE PLAN

Parcel	Area ha	Land Use Designation
ON MOUNTAIN		
Mid-Mountain Zone		
15	0,25	Mid-Mountain Lodge
16	2,0	Snow Play / Snow Sliding
17	21,5	Nordic & Snowshoe Zone
Mountain Top Zone		
18	0,2	Mountain Top Lodge
19	0,7	Snow Play / Snow Sliding
Central Plateau Zone		
20	0,2	Backside Lodge
21	0,3	Summer Parking
22	221,0	Nordic & Snowshoe Zone
TOTAL ON MOUNTAIN	**246,2**	

Mid-Mountain Zone

The mid-mountain lodge is identified by Parcel 15 and is situated centrally between the alpine ski trails, the beginner ski zone and snow play area in the mid-mountain zone. The lodge will provide staging facilities for all summer and winter activities in this area as well as restrooms, food service, lockers and seating areas for skiers and non-skiers. Parcel 16 identified 2 hectares designated for snow play and a snow sliding zone (tubing, sledding etc.). Parcel 17 outlines a proposed area for winter Nordic ski trails and snowshoe trails that in summer can be used for mountain biking and hiking.

Mountain Top Zone

Parcel 18 identified the location of the mountain top lodge which will include a restaurant, outdoor patio and additional guest services and operational services. This restaurant will be a destination for non-skiers throughout the year to take in views of Lake Prespa to the east and Lake Ohrid to the west. An area for sledding and snow play has also been designated in the Mountain Top Zone with Parcel 19. Some earthworks may be required to make a suitable slope and starting platform separate from the skier circulation in this area.

Mountain Restaurant with sunny restaurant patio

Central Plateau Zone

The gently sloped terrain between the summit of Mt. Tomoros and Krle Gola Buka is identified as the Central Plateau Zone. Lift 3 provides a connection to this area in the winter when the road over between the east and west side of Galičica National Park is closed. In the summer, this area is accessible by the pass road and has a small pullout area for parking. A building is planned at the base of Lift 3 to provide services for skiers and other recreationalists in this area (Parcel 20). A summer parking lot is proposed to the south of the Backside Lodge to provide a parking are for summer recreation facilities in this area. In the winter, the existing unpaved access road will remain snow covered and be used as part of the winter recreation trail network. Parcel 22 outlines 221 hectares designated for winter Nordic ski trails and snowshoeing trails and summer hiking and mountain biking trails.

.8.4 Base Area Land Use Plan – Lake Prespa

The base area land use plan for the Lake Prespa side of Galičica National Park is presented in Figure VII.3b. The people-mover gondola connection to the bottom of Lift 3 from Lake Prespa has been added to the master plan to illustrate a potential alignment that could be considered once the Galičica master plan has reached buildout. As the connection to Lake Prespa will only likely occur at a point in the future beyond the current planning horizon, only a large generic base area parcel has been identified in the Lake Prespa zone to indicate the most suitable site for the gondola terminal and proposed base area facilities. At this stage in the planning process, the market demand from the Lake Prespa side is so low that it is premature to plan this base area facility in any detail. However, the connection to Lake Prespa has been shown in a conceptual manner so that the master plan can integrate with future planning exercises in this area and that the gondola alignment and Parcel 23 can be preserved for a future connection to the Galičica Ski Center development.

Table VII.17 outlines the area general base area land use designation for Parcel 23 at the bottom of Lift 5 on the Lake Prespa side of Galičica National Park. The existing hotel development to the north should be evaluated for redevelopment and renovation opportunities as tourism grows in this region.

TABLE VII.17
BASE AREA LAND USE PLAN
LAKE PRESPA

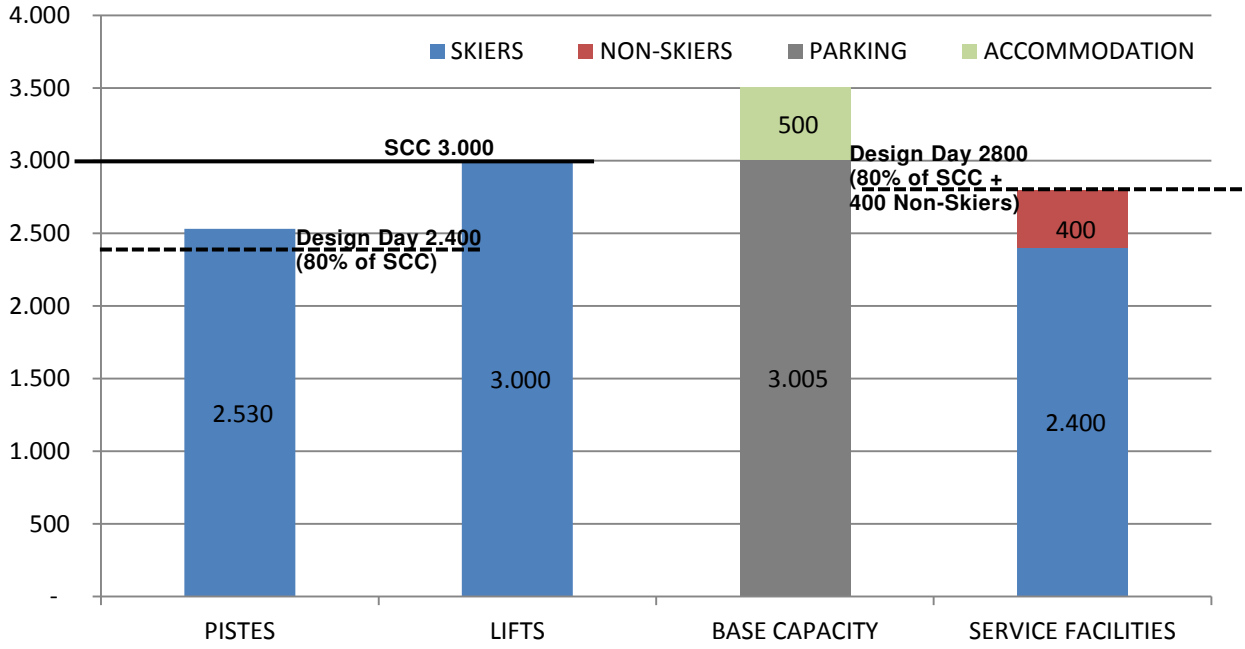
Parcel	Area ha	Land Use Designation
23	5,0	Mixed Base Area

View of Lake Prespa

.6 Area Facilities Balance

We have analyzed the "Skiers at One Time" (SAOT) of the lift system and pistes, as well as the overall daily capacity of the base area facilities, services and restaurant seats. The Galicica Ski Center has been designed for a capacity of 3.000 skiers and 500 non-skiers at buildout. Service facilities and restaurant seats are planned for a « Design Day » capacity of 2.800 visitors which represents 80% of the total ski center capacity of 3.500 visitors. A graphic representation of the overall balance of these facilities at build-out of the Galičica Ski Center is shown in Plate VII.3.

GALIČICA SKI CENTER
AREA FACILITIES BALANCE – BUILD-OUT
PLATE VII.3



.7 Resort Village Illustrative Plans

A conceptual illustrative master plan has been prepared for the Upper Peštani Base, the Gradište Lakeside Village and the potential future Oteshevo Base on Lake Prespa. The Resort Village Concepts illustrate the conceptual layout of proposed buildings, roads, driveways, parking, parcel areas and pedestrian zones, all of which are integrated into the existing landscape and surrounding development.

Upper Peštani Base

Proposed development in the Upper Peštani Base is situated above the day visitor base and parking lots at the bottom of the Galicica Ski Center main access gondola. A mix of accommodation including a Mountain Village has been designed to take advantage of surrounding views and is well connected to the gondola and other recreation facilities through a pedestrian trail network. The Resort Village Concept for the Upper Peštani Base is illustrated in Figure VII.6a. Table VII.18 provides a summary of the number of units planned for each of the ten SFU and Apartment parcels planned in the Upper Peštani Base, as shown on Figures VII.6a. Table VII.19 provides a detailed breakdown of the development program for the four hotel buildings that make up the Mountain Village. The assumptions of beds per unit for the three accommodation types outline in Table VII.9 has been applied to the program established in the Base Area Land Use Plan.

TABLE VII.18
UPPER PESTANI BASE
DEVELOPMENT PROGRAM

Parcel	Area ha	Land Use Designation	No. Beds	No. Units
Upper Peštani Base				
1	0,4	SFU	32	5
2	0,65	SFU	52	9
3	0,7	SFU	56	9
4	2,1	SFU	168	28
5	1,5	SFU	120	20
6	1,0	Apartments	200	50
7	0,55	Apartments	110	28
8	0,4	Apartments	80	20
9	0,6	Apartments	120	30
10	3,0	Hotel (Mountain Village)	1.200	600
11	2,1	SFU	168	28
Subtotal Upper Peštani Base	**18,8**		**2.306**	**827**

TABLE VII.19
UPPER PESTANI BASE
MOUNTAIN VILLAGE
HOTEL PROGRAM

Building	Footprint	No. Floors	G.F.A. m²	Lobby /Service m²	Accomm. Space m²	No. Beds 20m²/Bed	No. Units
A	1.940	4,5	8.730	1.940	6.790	340	170
B	1.910	4,5	8.595	1.910	6.685	334	167
C1	1.940	4,0	7.760	1.940	5.820	291	146
C2	1.560	4,0	6.240	1.560	4.680	234	117
Total	**7.350**		**31.325**	**7.350**	**23.975**	**1.199**	**600**

Gradište Lakeside Village

The development concept for the Gradište Lakeside Village is presented in Figure VII.6b. This concept includes 200 hotel units and 300 apartment and multi-family units which are proposed on the existing caravan site. The development is integrated into the existing museum and Roman ruins with a pedestrian trail network. The hotel is situated on the north side of the peninsula to take advantage of a close connection to the lakeside. The surrounding apartments and multi-family units are designed with a road network the generally reflects the existing vehicular circulation on the site with the intent of preserving as many trees as possible and maintaining a north-south pedestrian connection between both sides of the peninsula. A public parking lot is planned within the development to allow access to the lake and other amenities for day visitors.

The development program for the Gradište Lakeside Village is summarized in Tables VII.20 and VII.21.

TABLE VII.20
GRADISTE LAKESIDE VILLAGE
DEVELOPMENT PROGRAM

Parcel	Area ha	Land Use Designation	No. Beds	No. Units
Gradište				
14a	1,0	Hotel (Lakeside Village)	400	200
14b	6,0	MFU / Apartments	1.200	300
14c	2,6	Public Green Space	-	-
Subtotal Gradište	**9,6**		**1.,600**	**500**

TABLE VII.21
GRADISTE LAKESIDE VILLAGE
HOTEL PROGRAM

Building	Footprint	No. Floors	G.F.A. m²	Lobby /Service m²	Accomm. Space m²	No. Beds	No. Units
D	3.580	4,5	16.109	7.575	8.534	400	200

Note that a detailed space allocation is provided within section 5.2 of the Horwath report as a part of detailed specification of phase 1.

Oteshevo Base

The Oteshevo Base is located on the Lake Prespa side of the study area and is integrated into the bottom terminal of the potential future Oteshevo Connector Lift. The Oteshevo Base has been designed with a mix of accommodation and some surface parking, as shown in Figure VII.6c. As the Oteshevo Gondola has been planned as a future development beyond Phase 3 of the ski area development, the base area plan should be re-evaluated at a later date if/when detailed planning for the gondola us underway. The existing Oteshevo hotel development which is currently abandoned should also be considered for re-development as part of the Oteshevo base development. The Oteshevo base as shown is planned in a large 5 hectare parcel on the west side of the existing road along the lake as an alternative location suitable for a mix of parking, services and accommodation. If the property currently occupied by the Oteshevo hotels becomes available, it should be considered for redevelopment as the Oteshevo Base and gondola terminal.

Table VII.22 summarizes the development program for the Oteshevo Base. A total of 401 units are planned in a mix of hotel, apartment and villas (SFU).

TABLE VII.22
OTESHEVO BASE
DEVELOPMENT PROGRAM

Parcel	Area ha	Land Use Designation	No. Beds	No. Units
Oteshevo Base				
23a	1,7	Hotels	674	337
23b	0,9	Apartments	180	45
23c	1,4	SFU	114	19
23d	1,0	Surface Parking	n.a.	n.a.
Subtotal Oteshevo Base	**5,0**		**968**	**401**

Table VII.23 outlines the development program for the four hotels planned adjacent to the gondola terminal in the Oteshevo base.

TABLE VII.23
OTESHEVO BASE
HOTEL PROGRAM

Building	Footprint	No. Floors	G.F.A. m²	Lobby /Service m²	Accomm. Space m²	No. Beds	No. Units
E	1.600	3,5	5.600	1.600	4.000	200	100
F	1.440	3,5	5.040	1.440	3.600	180	90
G	1.150	3,5	4.025	1.150	2.875	144	72
H	1.195	3,5	4.183	1.195	2.988	149	75
Total	**5.385**		**18.848**	**5.385**	**13.463**	**673**	**337**

LAKE OHRID

Peštani

Upper Peštani Base

Lift 1A/ 6MGD

Gradište

Gradište
Lakeside Village

Lift 2 / PL

Mid-Mountain Zone

Lift 1B / 6MGD

Lift 4 / 4CLF

Lift 3 / 4CLF

Central Plateau Zone

Mt. Tomors
1673m

T-Bar

2CLF

Lift 5/8MGD

Krle Soja Buka
1986m

Lako Signoj
1984m

Oteshevo

Lake Prespa Base Area

LAKE PRESPA

GALIČICA
NATIONAL PARK

N

Date: 03/2014
Contours: 10 meters

Scale 1:20:000 (for A2 printout)

0 250 500 1.000 m

LEGEND

- EXISTING ROAD
- EXISTING PATH
- POWER LINE
- BUILDING
- CREEK
- EXISTING LIFT OUT OF SERVICE
- PROPOSED LIFT
- OTESHEVO CONNECTOR
- PROPOSED ACCESS ROAD
- FUTURE HIGHWAY
- SNOWSHOE/NORDIC TRAIL
- PROPOSED CONSTRUCTION ROAD

LAND USE DESIGNATIONS

- HOTEL/VILLAGE
- PARKING
- SINGLE-FAMILY UNITS
- APARTMENTS
- PUBLIC GREEN SPACE/PICNIC AREA
- SNOW PLAY/SLIDING AREA
- SERVICE BUILDING
- NORDIC& SNOWSHOE ZONE
- PROPOSED PISTE
- SNOWMAKING POND
- KIOSK/RESTAURANT

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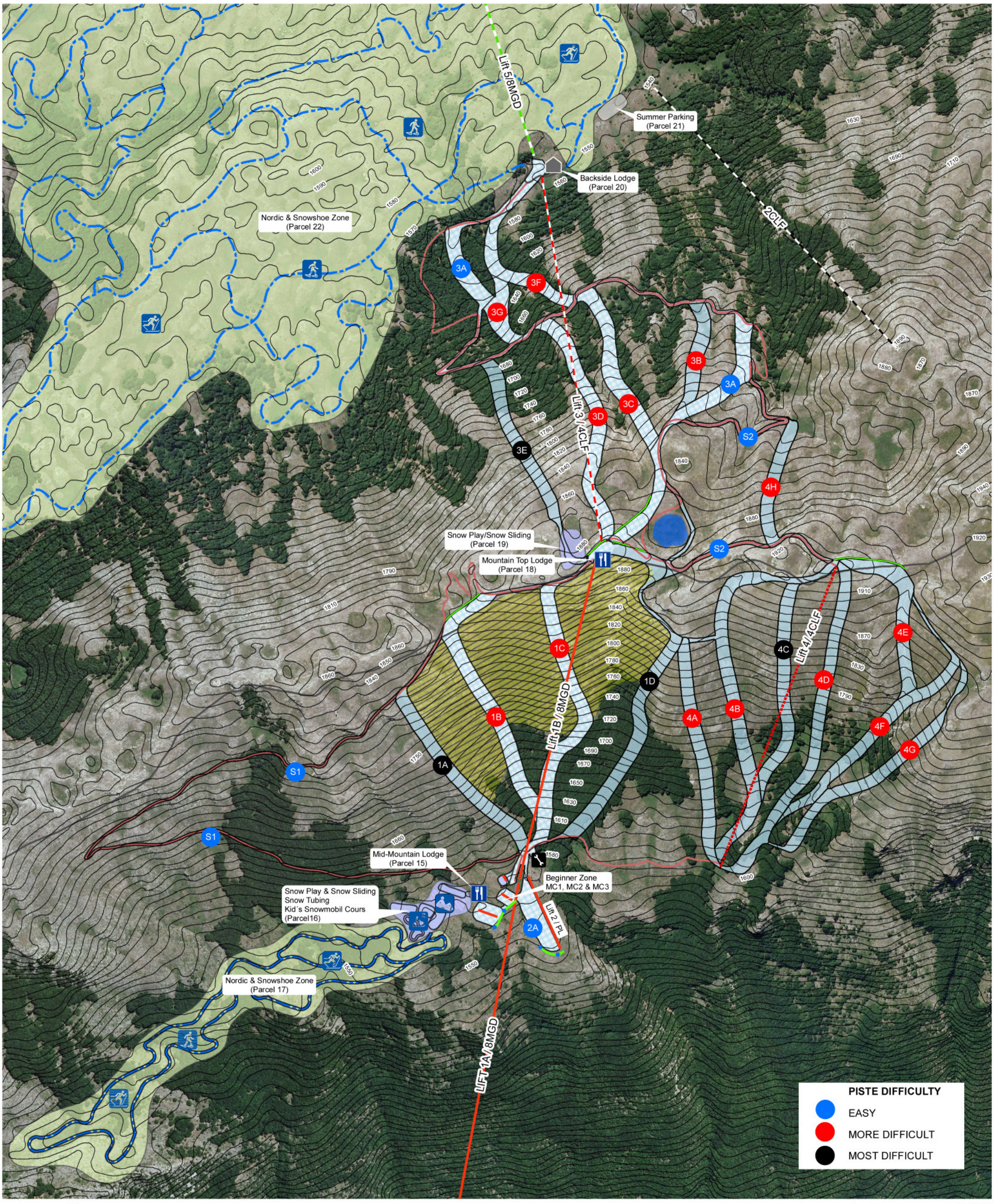
Figure VII.1

GALIČICA SKI CENTER - MASTER PLAN OVERVIEW



GALIČICA
NATIONAL PARK

Date: 02/2014

Contours: 10 meters

Scale 1:10.000 (for A3 printout)

0 100 200 400 m

LEGEND

PROPOSED LIFT
- PROPOSED LIFT - PHASE 1
- PROPOSED LIFT - PHASE 2
- PROPOSED LIFT - PHASE 3
- OTESHEVO CONNECTOR
- EXISTING LIFT OUT OF SERVICE
- PROPOSED CONSTRUCTION ROAD
- EXISTING PATH
- SNOW FENCE
- SAFETY FENCE
- NORDIC TRAIL
- PROPOSED PISTE
- PISE WITH SNOWMAKING
- FREERIDE AREA
- SNOWMAKING POND
- SNOW PLAY ZONE
- NORDIC SKI/SNOWSHOE AREA
- MAINTENANCE BUILDING

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Figure VII.2

GALIČICA SKI CENTER - MOUNTAIN MASTER PLAN

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N

Contours: 5 Meters Date: 03/2014

Scale 1:10 000 (for A3 Printout)

0 100 200 300 400 500m

LEGEND

- EXISTING PAVED ROAD
- FUTURE HIGHWAY
- PROPOSED ROAD
- PROPOSED LIFT
- NATIONAL PARK BOUNDARY

LAND USE PLAN DESIGNATIONS

- PARKING
- HOTEL / VILLAGE
- APARTMENTS
- SINGLE-FAMILY UNITS
- SERVICE BUILDING
- BEGINNER SKI AREA
- SNOW PLAY/SLIDING AREA
- NORDIC SKI/SNOWSHOE AREA
- PICNIC AREA / PUBLIC GREEN SPACE
- GONDOLA TERMINAL & 500m WALKING RADIUS

LAKE OHRID

Peštani

Gradište

Parcel 11 2.1 Ha.
Parcel 10 3.0 Ha. Mountain Village
Parcel 9 0.6 Ha.
Parcel 8 0.4 Ha.
Parcel 7 0.55 Ha.
Parcel 6 1.0 Ha.
Parcel 5 1.5 Ha.
Parcel 12 2.5 Ha.
Parcel 13 0.25 Ha.
Parcel P1 1.8 Ha.
Parcel P2 0.5 Ha.
Parcel P3 0.7 Ha.
Parcel 1 0.3 Ha.
Parcel 2 0.65 Ha.
Parcel 3 0.7 Ha.
Parcel 4 2.1 Ha.
Parcel 14c 2.6 Ha.
Parcel 14a 1.0 Ha.
Parcel 14b 6.0 Ha.
Parcel 17 21.5 Ha.
Parcel 16 2.0 Ha.
Parcel 15 0.25 Ha.

EXISTING ROAD

FUTURE HIGHWAY

LIFT 1A 8MGD

Upper Peštani Base

Gradište Lakeside Village

Mid-Mountain Zone

Figure VII.3a

GALIČICA SKI CENTER BASE AREA LAND USE PLAN - LAKE OHRID

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Contours: 5 Meters
Date: 02/2014

Scale 1:10 000 (for A3 Printout)

0 100 200 300 400 500m

Potential Lakeside Hotel
Re-Development/Revitilization Zone
7.3 Ha.

Parcel 23
5.0 Ha.

LIFT 5 8MGD

Oteshevo

LAKE PRESPA

LEGEND

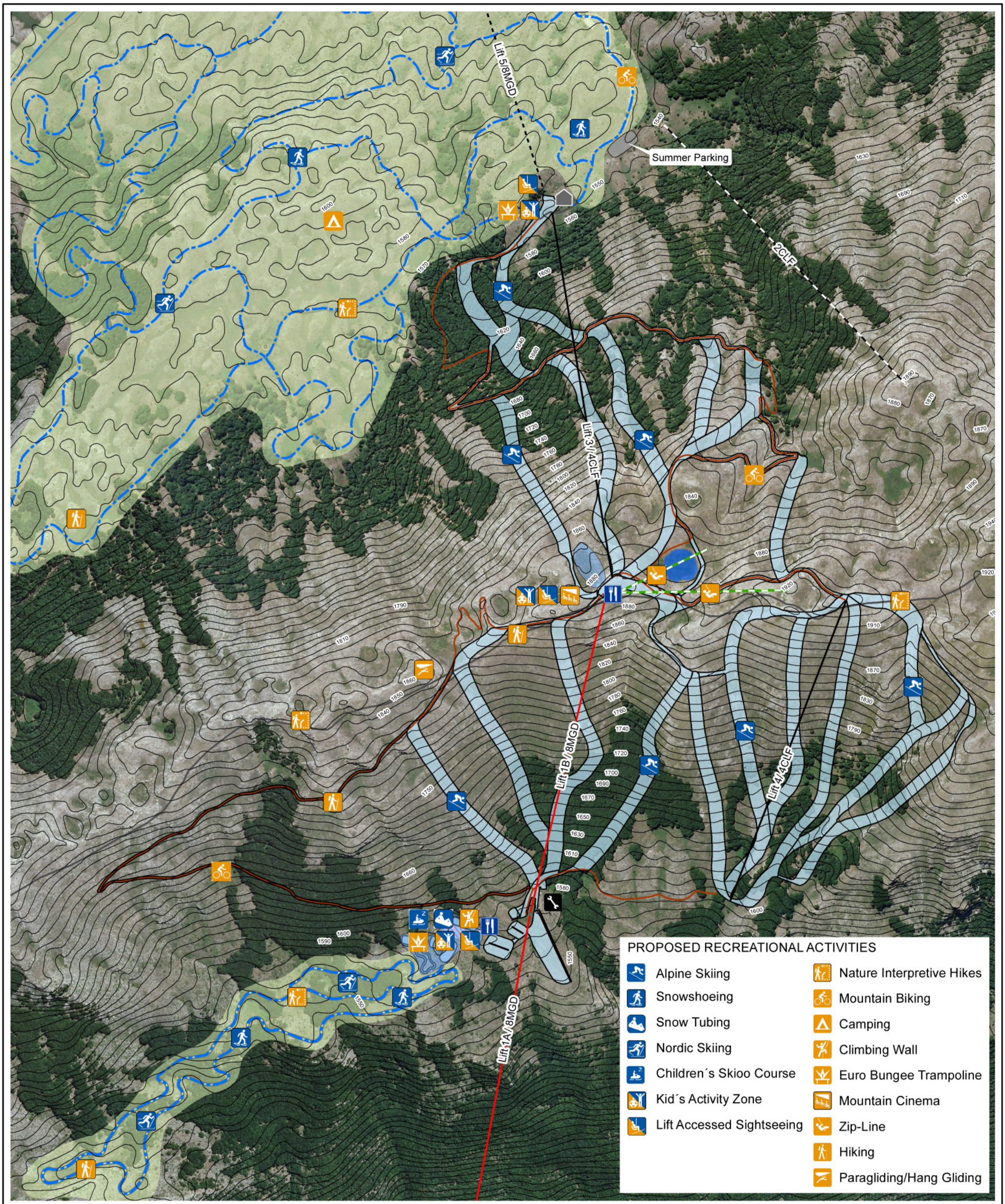
- EXISTING PAVED ROAD
- PROPOSED ROAD
- PROPOSED LIFT
- NATIONAL PARK BOUNDARY
- GONDOLA TERMINAL & 500m WALKING RADIUS

LAND USE PLAN DESIGNATIONS

- BASE AREA (PARKING, SERVICES & ACCOMMODATION)

Figure VII.3b

GALIČICA SKI CENTER BASE AREA LAND USE PLAN - LAKE PRESPA



GALIČICA
NATIONAL PARK

Date: 02/2014

Contours: 10 meters

Scale 1:10.000 (for A3 printout)

0 100 200 400 m

LEGEND

- WINTER OPERATION ONLY
- YEAR-ROUND OPERATION
- EXISTING LIFT OUT OF OPERATION
- PROPOSED CONSTRUCTION ROAD
- EXISTING PATH
- SNOWSHOE/NORDIC TRAIL
- ZIP-LINE
- PROPOSED PISTE
- SNOWMAKING POND
- KIOSK/RESTAURANT

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Figure VII.4

GALIČICA SKI CENTER SUMMER AND WINTER RECREATION PLAN

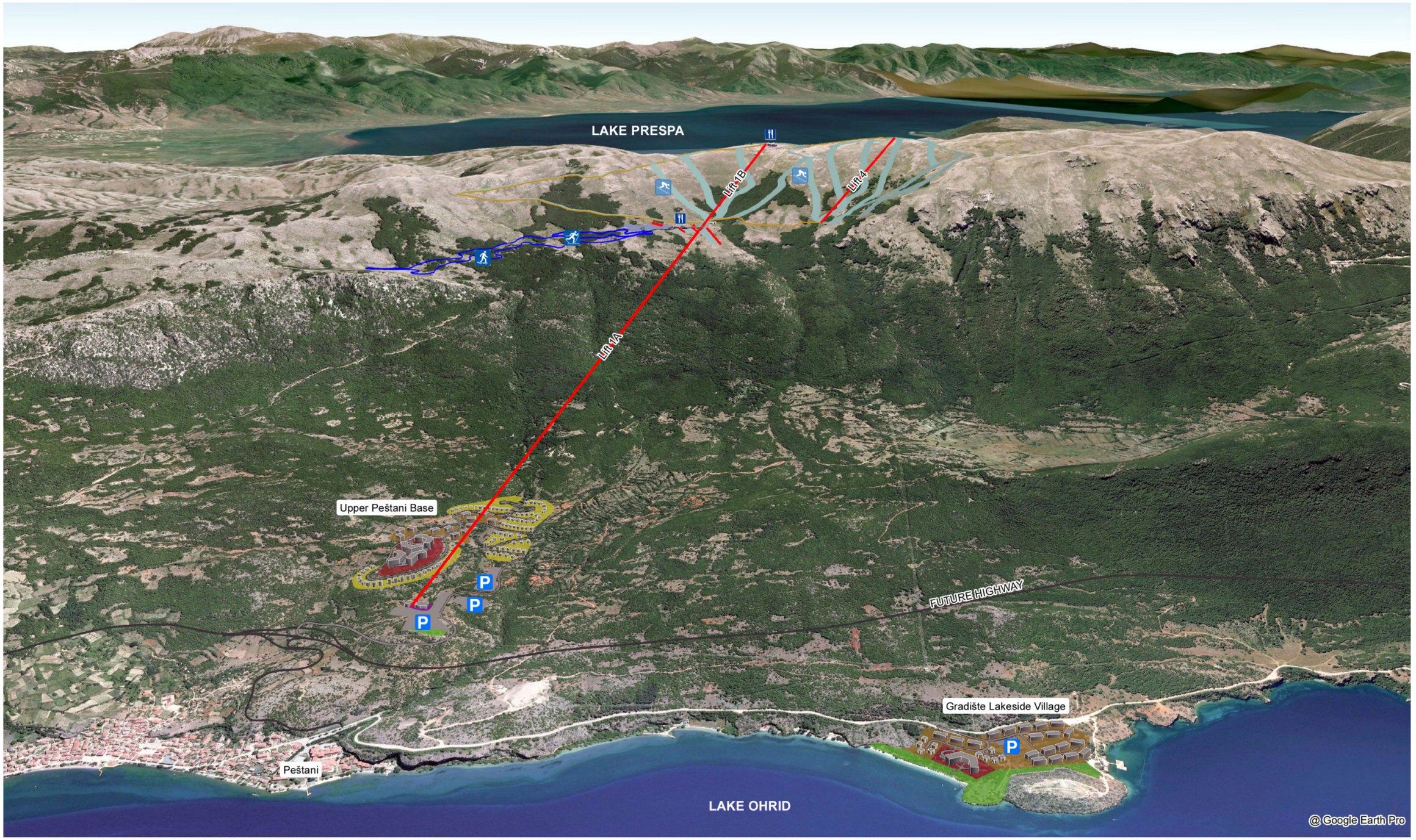

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Figure VII.5a
3D-VIEW: LAKE OHRID SIDE

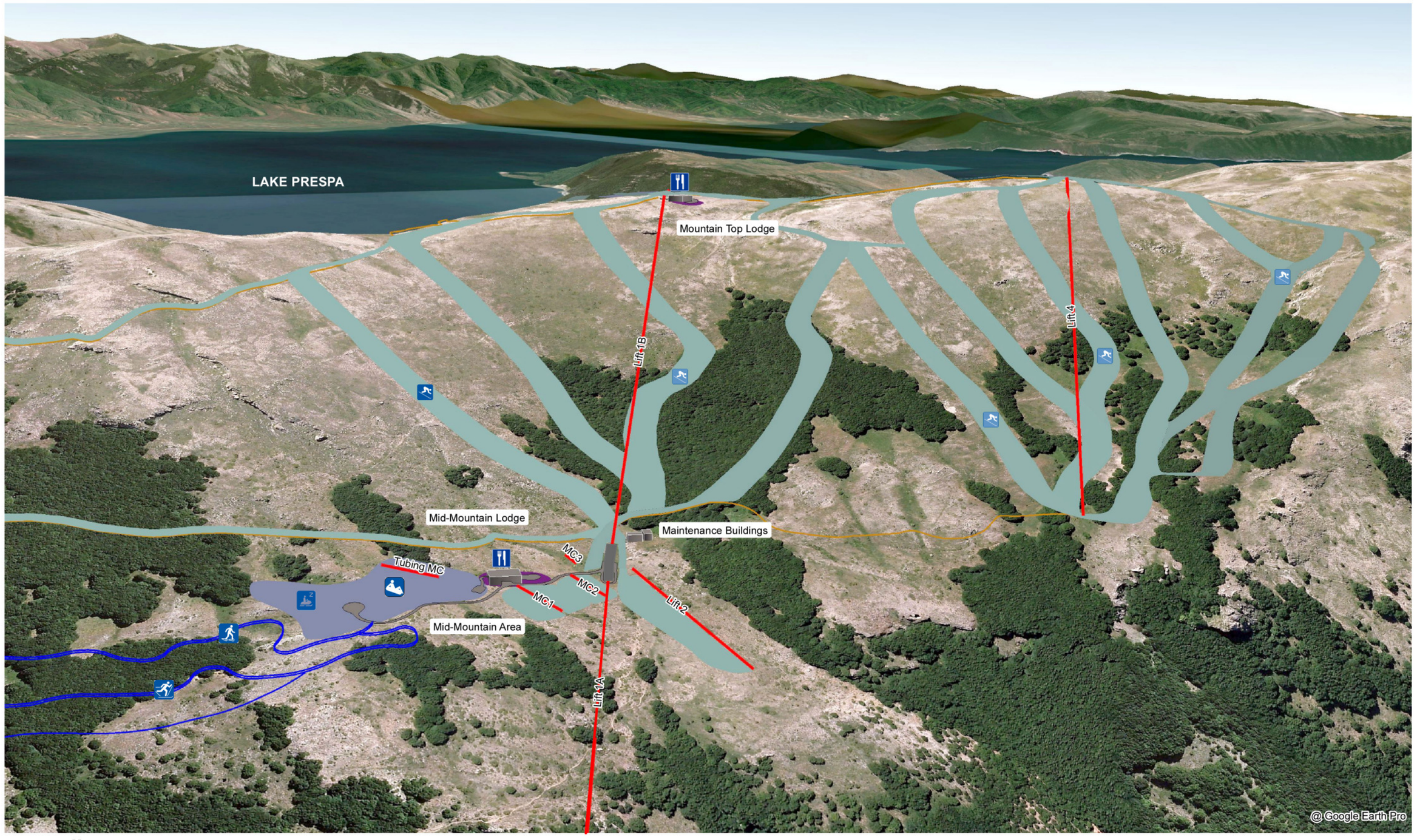

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Figure VII.5b

3D-VIEW: MOUNTAIN CONCEPT - LAKE OHRID SIDE

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Figure VII.5c

3D-VIEW: LAKE PRESPA SIDE

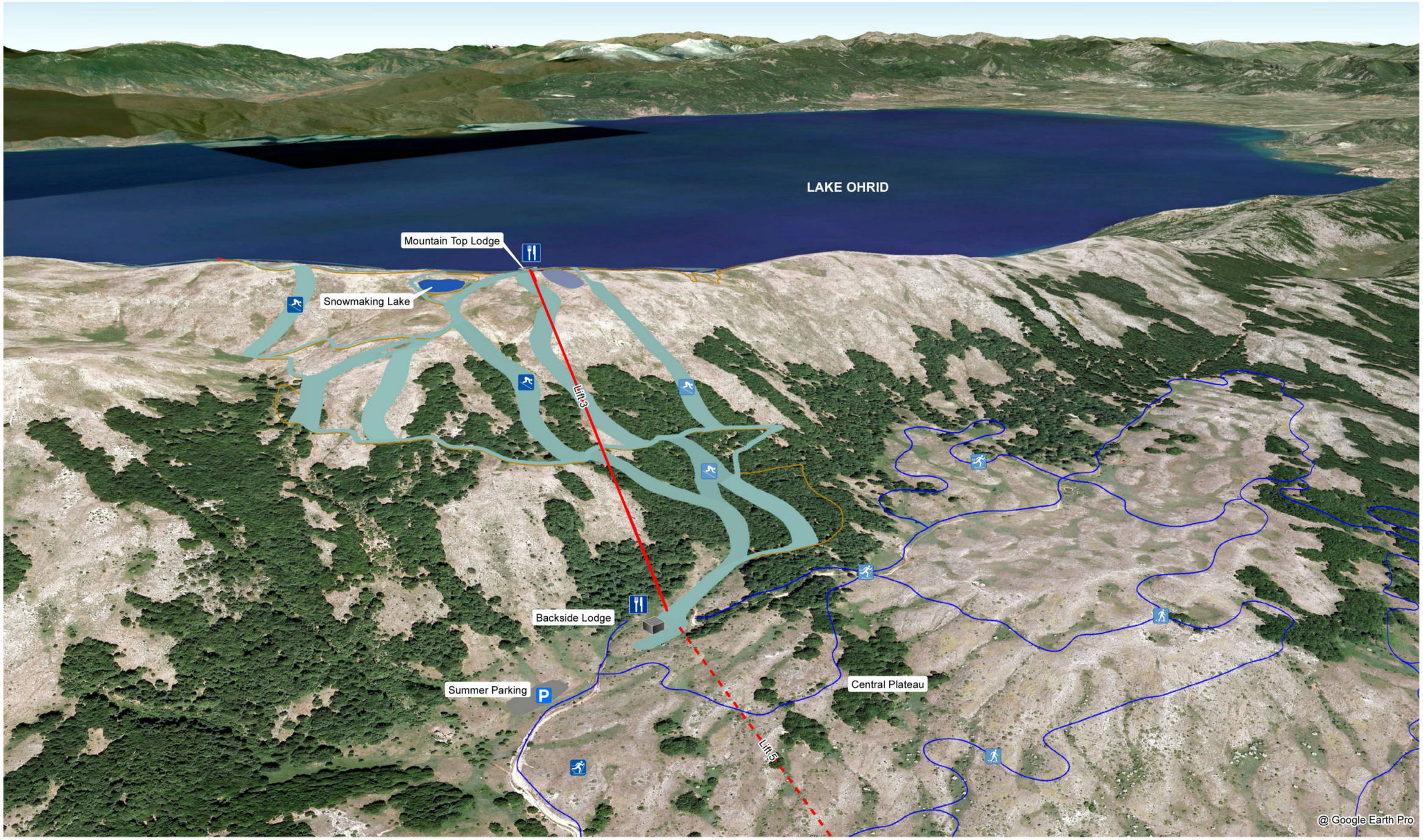

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Figure VII.5d

3D-VIEW: MOUNTAIN CONCEPT - LAKE PRESPA SIDE

RESORT VILLAGE CONCEPT - UPPER PEŠTANI BASE Fig.VII.6A

RESORT VILLAGE CONCEPT - GRADIŠTE LAKESIDE VILLAGE Fig.VII.6B

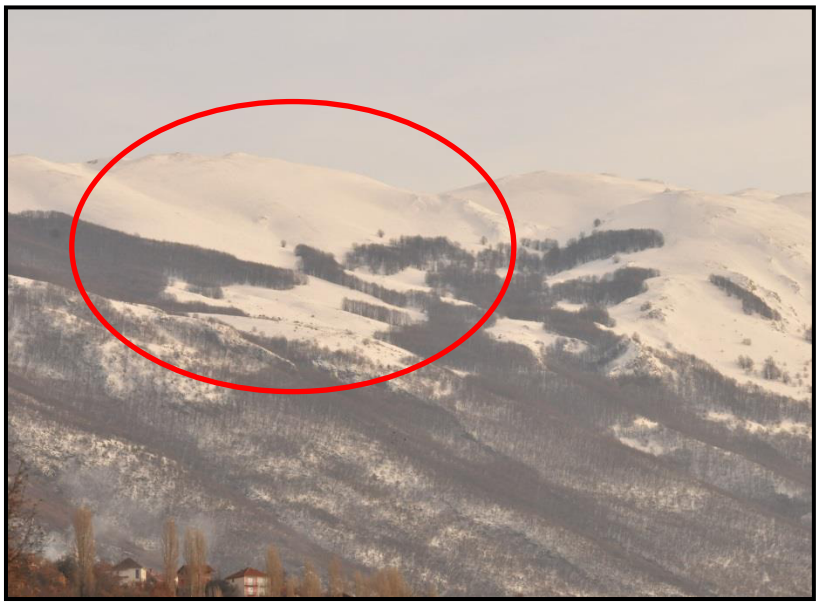
RESORT VILLAGE CONCEPT - OTESHEVO BASE Fig.VII.6C

VIII. PHASE 1 DETAILED DESIGN

Ecosign has prepared a Master Plan for the Galičica Ski Center in order to create a successful mountain resort offering 4 season recreation activities within the National Park.

The proposed developments as described previously in Section VII – Galičica Ski Center Master Plan and illustrated on Figure VII.1, have been phased in three stages of implementation. The proposed phasing is described in Section VII.3.3.5 and graphically illustrated on Figure VII.2 of this report document. According to the contract, Ecosign has prepared detailed development plans for the first phase of development of the Galičica Ski Center Master Plan. Phase 1 detailed planning and design is described hereafter and illustrated on following figures:

VIII.1 Galičica Ski Center Master Plan – Phase 1
VIII.2 Galičica Ski Center Gondola Terminal and Parking – Phase 1
VIII.3 Galičica Ski Center Mid-Mountain Zone – Phase 1
VIII.4 Galičica Ski Center Mountain Top Zone – Phase 1
VIII.5 Galičica Ski Center Mountain Infrastructure General Plan – Phase 1



Overview of the Phase 1 Ski Terrain

In addition to the detailed design of Phase 1, Ecosign has also produced following detailed plans for build-out of the envisioned Galičica Ski Center as described in section VII of this report:

VIII.6 Galičica Ski Center Master Plan – Build-out
VIII.7 Galičica Ski Center Gondola Terminal & Parking - Build-out
VIII.8 Galičica Ski Center Mid-Mountain Zone – Build-out
VIII.9 Galičica Ski Center Gondola & Lift 3 Top Zone –Build-out
VIII.10 Galičica Ski Center Lift 3 Bottom – Build-out

VIII.11 Galičica Ski Center Lift 4 Top – Build-out
VIII.12 Galičica Ski Center Lift 4 Bottom – Build-out
VIII.13 Galičica Ski Center Mountain Infrastructure Plan – Build-out

Note: These plans are intended for conceptual planning purposes only and are not to be used for construction. The location of all features at the ski center are based on 1:2.500 mapping received from the client, which as such, does not provide the needed accuracy for detailed design and construction. The location and specific design of all features must be reviewed and confirmed prior to construction. The conceptual location and arrangement of these features and/or earthworks envisioned to construct those features may need to be adjusted to conform to actual ground conditions and/or changes in the vision of the resort.

.1 Phase 1 Lift Infrastructure

A detailed description of the proposed lift systems for the Galičica Ski Center is given in report section VII.3.3.
Lift infrastructure planned for the first phase of development includes:

- one 8-passenger gondola lift with a mid-station (Lift1A/1B)
- one surface platter lift (Lift 2) and
- three moving carpets (MC1, MC2 and MC3).

Lift 1A, an 8-passenger gondola lift with a rated capacity of 1.800 P/h serves as access lift system for skiers and other visitors to the Galičica ski center. The lift transports skiers and non-skiing visitors from the base area at an elevation of 840 meters up to the Mid-Mountain Zone at 1.580 meters and is continuing to the mountain top located at 1.895 meters as Lift 1B without passengers needing to get off at the intermediate station. It is important to consider that all skiers and sightseers will have to download with Lift 1A in order to return to the parking at the end of the day. Ecosign has calculated the morning upstaging and egress time for a Phase 1 peak day. The lift system will be able to stage all visitors within less than one hour, which is faster than the industry standards. At buildout the staging/egress time will be approx. two hours, which is still relatively good. Space for carrier parking of the entire lift 1A+1B is proposed at the bottom station on the north side of the terminal.

The upper section of the gondola (Lift 1B) offers the possibility for return cycle skiing on four pistes and, if the natural snowpack is sufficient, there will also be good quality off-piste skiing accessible in this area. We propose clockwise rotation of the rope (i.e. uphill loading at the Mid-Mountain on the northern side of the station).

At the Mid-Mountain Zone accessible from the gondola intermediate station, the platter lift and the moving carpets will serve easy beginner slopes as well as snow play and sliding areas.

Overview of the Mid-Mountain Zone

MC 1 is proposed as a 55 meters long conveyor belt serving one beginner slope on either side with an average inclination of 12%.

MC 2 is proposed as a 35 meters long carpet with an average slope of 10%. MC 2 will also be used by skiers to get from Lift 2 back to the skier service building.

MC 3 is proposed as a 20 meters long carpet with an average slope of 8%. MC 3 will be serving the snow play area and first step beginners.

In total, the skier carrying capacity (SCC) of the lift system will add up to 880 skiers at completion of Phase 1. The technical specifications of the Phase 1 lift systems are listed in Table VIII.1 below.

TABLE VIII.1
GALIČICA SKI CENTER
SKIER CARRYING CAPACITY – PHASE 1

Lift Number **Lift Type**	**1A** **8MGD**	**1B** **8MGD**	**2** **PL**	**MC1** **MC**	**MC2** **MC**	**MC3** **MC**	**TOTAL**
Top Elevation [m]	1.580	1.895	1.580	1.580	1.580	1.582	
Bottom Elevation [m]	840	1.580	1.547	1.573	1.576	1.580	
Total Vertical [m]	740	315	33	7	4	2	1.100
Horizontal Distance [m]	2.602	861	210	55	35	20	
Slope Distance [m]	2.705	917	213	55	35	20	3.945
Average Slope [%]	28%	37%	16%	12%	10%	8%	
Rated Capacity [P/h]	1.800	1.800	600	1.200	1.200	1.200	7.800
V.T.M./Hr.(000)	1.332	567	20	8	7	2	1.936
Rope Speed [m/sec]	5,0	5,0	2,0	0,9	0,9	0,9	
Trip Time [min]	9,02	3,06	1,77	1,03	0,65	0,37	
Operating Hrs./Day	8,0	8,0	7,5	7,5	7,5	7,5	7,7
Loading Effic. [%]	95%	95%	80%	80%	80%	80%	
Access Reduction [%]	100%	38%	0%	5%	30%	50%	
Potential SCC [Skiers/Day]	**0**	**610**	**170**	**60**	**30**	**10**	**880**

.2 Phase 1 Ski Pistes

Most of the terrain accessible in Phase 1 will be served by Lift 1B. From the top of the Gondola lift, skiers can choose between two red runs (Piste 1B and Piste 1C), two black runs (Piste 1A and Piste 1D) or go off-piste skiing in either of the proposed Freeride Areas. Since the terrain served by Lift 1A is relatively steep, this lift will be great for high intermediate to expert skiers. Due to the natural terrain, Lift 1B does not offer any ski pistes for skiers which are not capable of skiing on red runs. Those skiers will have to ski at the Mid-Mountain area until Lift 3 will be built in Phase 2.

The beginner zone adjacent to the surface platter lift and the moving carpets are designed so that they are ideal for learning and teaching how to ski. Overall, the learning zone at the Mid-Mountain area offers a great variety of beginner slopes starting with an 8% slope on MC 3, a 10% slope on MC 2, and a 12% slope on MC 1. Piste 2A is served by a platter surface lift (Lift 2) and has an average slope of 17%. For the moving carpet lifts, we propose a flat unloading area as well as a horizontal run-out zone at the bottom of the ski slope.

Construction of some pistes will require terrain grading, this in particular at the Mid-Mountain Zone, the Mountain Top as well as for implementation of the proposed skiways. The proposed design grades are illustrated on Fig. VIII.3 and Fig. VIII.4.

Following list describes the locations that will require significant earthwork:

- Leveling of the mountain top area to 1.895m elevation as illustrated on Fig. VIII.4
- Piste/skiway construction from the mountain top (1.895m) towards the north down to the top of Piste 1A (1.815m) as illustrated on Fig. VIII.4.
- Construction of a skiway on piste 1D between the 1.870m contour and the 1.850m contour as illustrated on Fig. VIII.4.
- Construction of the beginner area and leveling of Piste 2A at the Mid-Mountain zone as illustrated on Fig. VIII.3.
- Construction of a skiway at the lower section of piste 1D leading to the mid-station as illustrated on Fig. VIII.3.

Ecosign recommends constructing the proposed skiways at 10% inclination with a width of 8 to 10 meters.

For Phase 1, Ecosign has proposed 7 numbered return-cycle ski pistes covering approximately 13,6 hectares of terrain over a total combined length of 4,2 kilometers (see Table VIII.2). Table VIII.2 also lists the resulting skier carrying capacity of each of the pistes of Phase 1 development. The overall capacity of the piste system is 700 skiers.

TABLE VIII.2
GALIČICA SKI CENTER
SKI PISTE INVENTORY – PHASE 1

Trail Name	Trail No.	Skill Class	Total Vert. [m]	Horz. Dist. [m]	Slope Dist. [m]	Slope Average [%]	Slope Steep. [%]	Ave. Width [m]	Horz. Area [ha]	Slope Area [ha]	Skiers at Area Density [skier/ha]	Skiers at Area Total
Lift 1B												
	1A	6	248	741	781	33%	54%	29	2,17	2,29	22,5	50
	1B	5	258	842	881	31%	48%	34	2,85	2,98	45	130
	1C	5	300	871	921	34%	50%	34	2,97	3,14	45	140
	1D	6	315	1.215	1.255	26%	51%	30	3,60	3,72	22,5	80
	Off-Piste	7	233	380	446	61%	70%	-	21,00	24,63	3	70
Total Lift 1B*	4*				3.838*					12,13*		470
Lift 2												
	2A	1	33	200	203	17%	20%	44	0,88	0,89	150	130
Total Lift 2	1				203					0,89		130
MC1												
	6A	1	7	55	55	12%	12%	73	0,40	0,40	150	60
Total MC1	1				55					0,40		60
MC2												
	7A	1	4	35	35	10%	10%	57	0,20	0,20	150	30
Total MC2	1				35					0,20		30
MC3												
	Snow play	1	7	20	20	8%	10%	50	0,05	0,05	150	10
Total MC3					20					0,05		10
Total All Lifts	**7**				**4,2km**					**13,6 ha**		**700**

* not including off-piste terrain

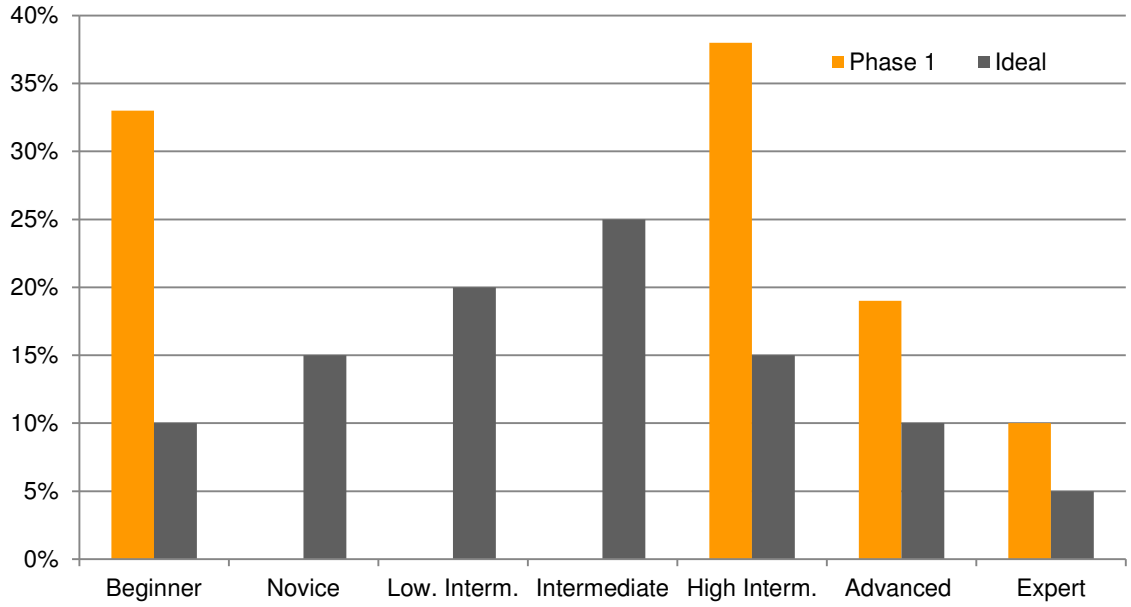
As shown in Plate VIII.1, the resulting piste variety for Phase 1 is not well balanced with a significant surplus of beginner terrain and terrain for high intermediate to expert skiers and a lack of ski terrain for novice to intermediate skiers. The reason for the imbalance in the first phase is the result of the natural terrain of the mountain accessible from Lift 1. However, the balance will improve dramatically in Phase 2 with the construction of Lift 3 which accesses terrain for novice to intermediate skiers. Once Lift 3 and Lift 4 are implemented, the terrain distribution will match quite well with the demand of the Macedonian Skier market as shown in Plate VII.1.

It is important to have the piste and lift capacity balanced in order to avoid overcrowded pistes and extensive waiting lines at the lift terminals. As Plate VIII.2 shows, the capacities of the proposed lift and trails are well balanced.

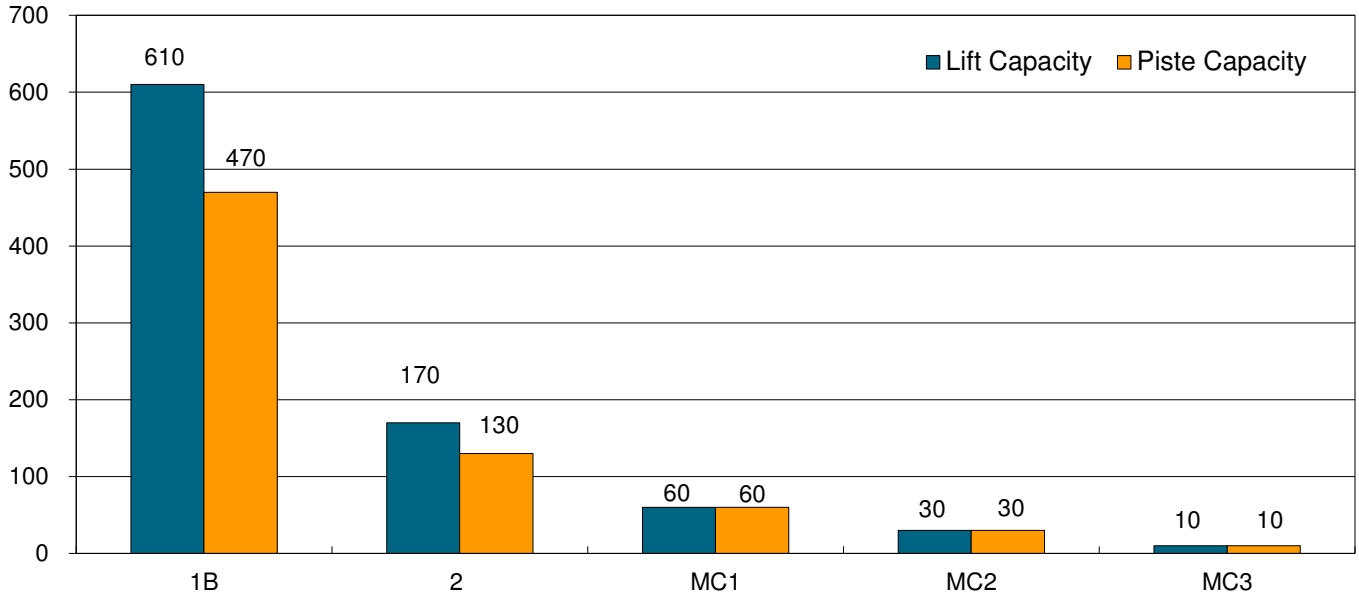
TABLE VIII.3
GALIČICA SKI CENTER
PISTE BALANCE BY SKILL CLASS – PHASE 1
(LIFT SCC = 880)

Skill Classification	Hectares	Skiers	Balance	Ideal
1 Beginner	1,54	230	33%	10%
2 Novice	-	-	0%	15%
3 Low Intermediate	-	-	0%	20%
4 Intermediate	-	-	0%	25%
5 High Intermediate	6,12	270	38%	15%
6 Advanced	6,01	130	19%	10%
7 Expert	off-piste	70	10%	5%
TOTALS	13,67	700	100%	100%

CUMULATIVE SKI PISTE
BALANCE STATEMENT
PLATE VIII.1



LIFT VS. SKI PISTE CAPACITIES
BALANCE BY LIFT SYSTEM – PHASE 1
PLATE VIII.2



.3 Grooming Requirements

The grooming requirements for Implementation Phase 1 and for build-out have been calculated and summarized in Table VII.6 in Chapter VII.3.3.8 of this report.

For Phase 1 development, one standard grooming machine and one winch-equipped machine is required. Finally at build-out the grooming fleet of the Galičica Ski Area will include two standard grooming machines plus two winch-equipped machines.

.4 Snowmaking

The concept of the snowmaking system and our recommendations in this regard are described in section VII.3.3.6 of this report document. The installation of a snowmaking system is important to ensure early and late season snowpack and a long lasting, good quality snow surface that will stand up to a large amount of skier traffic.

Ideally implementation of the snowmaking system goes along with realization of the proposed development steps of the on-mountain infrastructure. As already mentioned in this report document, a detailed snowmaking concept for the Galičica Ski Area will need to be elaborated by a specialized snowmaking company. Although it would be ideal to have artificial snowmaking installed from the very beginning (Phase 1) this investment could also be postponed into later phases of implementation at which more weather and snow cover data and operational experience is available.

Following the calculated snowmaking requirements for Phase 1:
For Phase 1 we suggest to have a snowmaking system installed on piste 1B, 1C and 2A as well as to cover the entire Beginner Zone at the mid-mountain area with artificial snow. As indicated in Table VII.5, the calculated requirement for Phase 1 amounts to approximately 38.500m³ of water in order to cover the above mentioned pistes in Phase 1. At build-out a total of approx. 104.500m³ of water will be required per season.

Snowmaking System

Note: Detailed planning for the snowmaking system will require further analyses of weather conditions and water availability on the site.

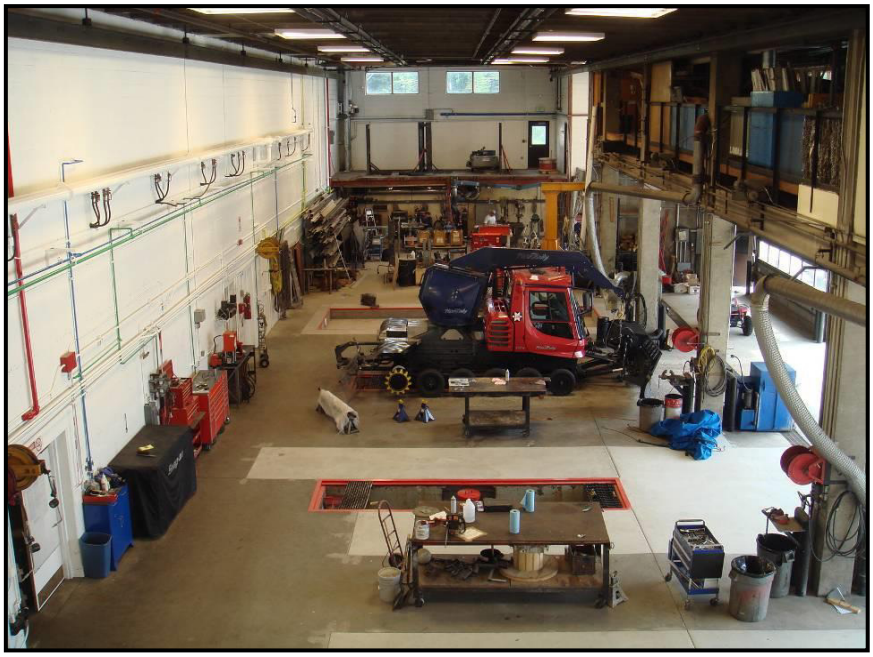
.5 Maintenance Facility

A maintenance facility is required at ski centers for the storage of grooming machines and rubber tired vehicles, lift maintenance shop, maintenance offices, etc. The maintenance facility must have easy access for rubber tire traffic and also easy access to the ski trails for the grooming machines. Ideally, this facility should be hidden from the public view, using existing trees as a buffer.

As a general rule of thumb, the maintenance shop should have one bay of approximately 75 square meters in size (7,5 meters by 10 meters) for each front line grooming machine at build-out. For Phase 1 of the Galičica Ski Center, we propose one maintenance building at the mid-mountain Zone as illustrated on Fig. VIII.3. The proposed building has an area of 150m² and should be sufficient to accommodate the two grooming machines and the snowmobiles. Furthermore this building can include a sign shop and should be utilized for lift maintenance, electrical maintenance, etc. The maintenance facility should provide a washroom and employee area, as well as parts storage, which are often located in a second

floor mezzanine. A fuel depot should be located adjacent to the shop for fueling all the rubber tire and on-snow vehicles.

In order to meet the maintenance facility floorspace requirements at build-out, we suggest to add another maintenance building next to the one proposed in Phase 1. The additional building is illustrated on Fig. VIII.8

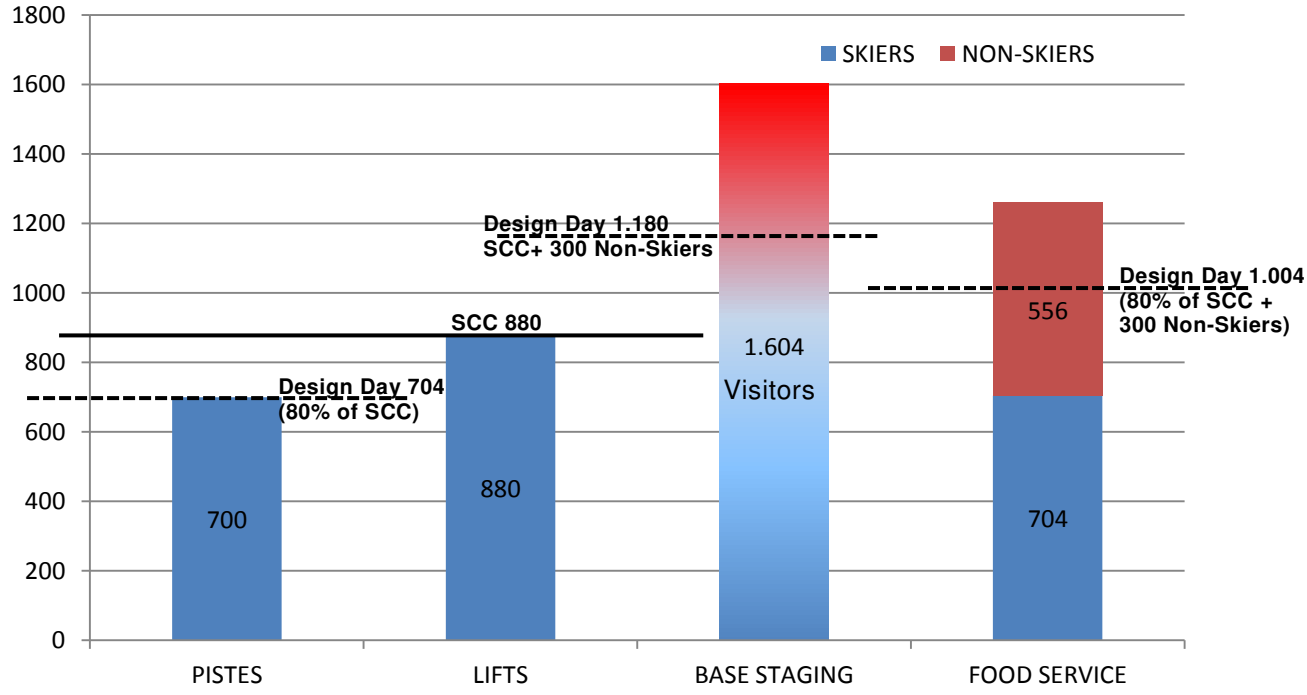


Maintenance Shop Service Bay

.6 Area Facilities Balance

We have analyzed the "Skiers at One Time" (SAOT) and the daily capacity at Phase 1 of the following operational elements: lift capacity, capacity of the pistes, food service seating and the base area staging capacity (day skier parking, visitors from accommodation). A graphic representation of the overall balance of these facilities is shown in Plate VIII.3. To easily compare these diverse facilities, all capacities have been calculated as the number of skiers that can be handled in one day. Also shown on this graph is the calculated design day business level for the pistes which is 80% of the theoretical lift capacity in number of skiers. Base staging capacity needs to be designed for the 100% of the capacity of the ski facility plus non-skiers (otherwise the facility will never be full), and food service should be designed for design day of 80% of SCC plus 300 non-skiers.

GALIČICA SKI CENTER
PHASE 1 AREA FACILITIES BALANCE
PLATE VIII.3



.7 Mountain Infrastructure Plan

Mountain Access Road

At every ski area, it is necessary to both construct and maintain the lifts, pistes, snowmaking, etc. The most efficient way to access the sites for construction and maintenance purposes in the summer is via roadway. For construction of Phase 1 of Galičica Ski Center, it is proposed to use the existing main pass road connecting the two lake areas in summer and from there using the existing bench road leading to the central plateau. This is a paved road which leads to the proposed bottom station location of Lift 3. At the elevation of 1.560 meters, a 6,6km long new gravel road is envisioned, leading towards the location of the new mountain top (1.895m) and from there down to the Mid-Mountain zone (1.580m).

In Phase 2 the same road can be used for construction of Lift 3. For installation of Lift 4, we propose to build a new road section from the saddle above the snowmaking pond (approx. 1880m elevation) along the ridge to the top station of Lift 4. For construction of the bottom terminal we suggest to add an approximately 430m long gravel road section connecting from the Mid-Mountain Zone to the bottom of Lift 4. The alignment of the proposed gravel surface mountain access road is illustrated on Figure VIII.5 for Phase 1 and on Figure VIII.13 for build-out ski center.

The proposed construction road has been designed so that construction costs as well as necessary earth movements and thus impacts on nature will be minimized. In general, the mountain access roads should be 1-1½ lanes wide (5-8 meters wide) over its entire length. It is recommended that all sections of the existing road be examined to determine if it meets these requirements since the required improvements or road widening of the existing road would have to be completed prior to the construction of the lifts and buildings.

Mountain Access Road in Winter

Primary Power - Mountain

Figure VIII.5 and VIII.13 also illustrate the proposed route that the primary power line would take at Phase 1 and for build-out of the Galičica Ski Center. We have assumed that 3-phase power will be supplied to the base of the ski facility by the local electrical utility company. We suggest to have the power line in a trench, alternatively an overhead line could be installed. An overhead solution is cheaper than the trench solution but has a bigger visual impact and is subject to icing or trees falling on the power line.

From the base area, we propose a direct connection to the Mid-Mountain Zone. From there we suggest to have ne power line along piste 1C to the Mountain Top, dimensioned big enough to support the ski system and restaurant infrastructure at build-out, and one power line along the proposed construction road to the bottom of Lift 4. If there is now power supply available on the Central Plateau, we suggest to connect from the mountain top along Piste 3D and 3G to the Backside Lodge and the bottom terminal of Lift 3 respectively.

Transformers will be required on the mountain to convert the primary voltage to the required volts for the lift drive station and the requirements of the mountain restaurant. These electrical power supplies includes lifts, snowmaking and general building use. Details need to be refined once detailed information is available from the lift and snowmaking manufacturers and the building engineers.

Telephone and Communication lines

The lift communication lines need to follow the lift lines since they need to transmit safety signals from the stations and lift towers to the opposite stations to control the lift. Whenever possible, these communication lines are placed underground, following the lift line as far as practicable. Detailed routing and channeling is to be determined by the lift manufacturer upon determination of tower positions.

We assume that telephone and communication connections will be provided to the base facilities. Consequently we suggest to connect from there along the lift line of Lift 1A/Lift 1B to the Mid-Mountain Zone and the Mountain Top and from there along the lift line of Lift 3 to the Backside Lodge.

For connection of the communication line with Lift 4, Ecosign suggest to go along the proposed construction road to the bottom station and from there along the lift line to the mountain top.

Potable Water and Sewer

We assume that the base area facilities will be connected to the local potable water and sewer system. Unless there is a potable water well on the mountain that can supply sufficient water, for water supply of the Mid-Mountain Zone a pipeline from the base facilities to the Mid-Mountain locations will be required. This would pump water at just enough pressure and at a low volume to fill a reservoir at Mid-Mountain. Then a pressure pump and pressure tank would be used to supply water to the buildings located at the Mid-Mountain zone.

For the mountain top restaurant scheduled for construction in Phase 2, connection to the fresh water supply with a small diameter water pipe will need to continue to the Mountain Top, fed by a booster pump. If a trench is opened to the top during Phase 1 construction, we recommend to install these pipes in Phase 1 to avoid unnecessary construction and soil disturbance in Phase 2.

Depending on whether or not there is enough potable water available at the Central Plateau, a water pipe connection from the mountain top to the Backside Lodge might be required as well.

For the water pipelines described above, the same routing as for the power supply is suggested but depending on local regulations the water pipes may need to be in a separate trench.

In regards of sewer, a septic tank and drainage field could be installed at the Mid-Mountain zone for Phase 1. A temporary composting toilet could be installed at the Mountain Top. Ultimately, a sewage line from the mountain top to the base

will be needed when business level increases towards buildout. For the Backside Lodge a septic tank and drainage field should be sufficing even at build-out.

The potable water and sewer lines should be installed on the same ski piste as the primary electrical power lines to minimize disruption to the piste system.

.8 Phase 1 Base Area Development

The first phase of development in the Upper Peštani Base includes day visitor parking lot P1, the paved access road connecting to the future highway, a base area service building adjacent to the gondola bottom station and 33 single-family / chalet units on the south side of the gondola line. A picnic area, viewpoint and network of pedestrian paths is also planned within the Upper Peštani base area development in Phase 1. Figure VIII.2 illustrates the configuration of the access road, parking, service building and gondola terminal in Phase 1 of the Galičica ski center development.

The Mid-Mountain zone is fully developed in Phase 1 and includes a variety of activities for non-skiers. The Mid-Mountain lodge is accessed from the gondola mid-station by a pedestrian walkway on the upper side of the moving carpet zone and beginner area. An extensive snow-play zone including a snow tubing area, sledding zones, walk-up carpets, a children's mini-snowmobile track and access to a 5km Nordic trail network has been designed. Several outdoor patios, picnic zones and fire pits are also designed within the Mid-Mountain Zone to provide an attraction and viewing area for non-skiers. Figure VIII.3 illustrates the detailed layout of the Mid-Mountain Lodge, activity zones and lifts in the Mid-Mountain Zone.

Children's Snow Play Zone (Mid-Mountain Zone)

In Phase 1, prior to the construction of the mountain top restaurant, a viewing platform is proposed at the top of the gondola to provide circulation space for non-skiers and sightseers. The viewing platform is located on the south side of the gondola station, taking advantage of views towards Lake Ohrid to the west and Lake Prespa to the east. In the summer, hikers will be able to access the existing ridge trail that extends along the height of land from the top of the gondola. Simple food service such as an outdoor BBQ can be provided on the viewing platform.

Phase 1 Parking

The first of three planned parking lots (P1) is developed in Phase 1 directly adjacent to the gondola terminal. The total area of lot P1 is 1,8 hectares which has a capacity of 594 cars, as shown in Table VIII.4. Lot P1 can generate over 1.604 guests at maximum capacity which exceeds the anticipated Phase 1 capacity of the ski area of 880 skiers. However, it is anticipated that a significant number of sightseers will also be using the base area facilities, therefore it is advised to build lot P1 to its maximum capacity in Phase 1. Alternatively, 80% of P1 can be built in Phase 1 with additional 20% capacity added in Phase 2.

TABLE VIII.4
GALIČICA SKI CENTER
PHASE 1 PARKING PROGRAM

Parcel	Area ha	Land Use Designation	No. Cars	No. Visitors
P1	1,8	Surface Parking	594	1.604

Phase 1 Accommodation

In Phase 1, the Gradište Lakeside Village is completely developed along with a limited number of real estate units in the Upper Peštani Base. The Gradište development includes 200 hotel units and 300 multi-family/apartment units integrated with the existing museum and the historic fort at the end of the peninsula. Green space with public access is planned as a buffer between the existing tourism facilities and the proposed development. The hotel is proposed on the waterfront on the north side of the development, as shown in Figure VIII.1, with apartment units planned over 6,0 hectares on the existing caravan park between the hotel and the museum. Table VII.5 outlines the development program for the Gradište lakeside village, which is described in section VII of this report.

TABLE VII.5
GRADISTE LAKESIDE VILLAGE
LAND USE PLAN AND DEVELOPMENT PROGRAM

Parcel	Area ha	Land Use Designation	No. Beds	No. Units
Gradište				
14a	1,0	Hotel (Lakeside Village)	400	200
14b	6,0	MFU / Apartments	1.200	300
14c	2,6	Public Green Space	-	-
Subtotal Gradište	**9,6**		**1.600**	**500**

In the Upper Peštani Base development parcels 1, 2, 3 and 4a designated for single-family units are located above Lot P1 along the first segment of the proposed real estate access road on the south side of the gondola line. Approximately 925m of paved road is required to access the Phase 1 real estate from the entrance to P1. The four Phase 1 real estate parcels have a total area of

2,5 hectares and can yield approximately 200 beds or 33 single-family units. This development represents 30% of the total single family units planned in the Upper Peštani Base. With low occupancy and skier participation rates assumed for low density private accommodation, the skier yield from the Phase 1 accommodation is 5% of total beds or a total of 10 skiers (based on 200 beds). Table VIII.6 provides a summary of the Phase 1 land use plan and development program. Parcels 1 – 4a are illustrated in Figure VIII.1.

TABLE VIII.6
UPPER PESTANI BASE
PHASE 1 LAND USE PLAN & DEVELOPMENT PROGRAM

Parcel	Area Ha	Land Use Designation	Beds per Ha	No. Beds	No. Units
Phase 1 Upper Peštani Base					
P1	1,80	Parking & Drop Off			
1	0,40	SFU	80	32	5
2	0,65	SFU	80	52	9
3	0,70	SFU	80	56	9
4a	0,75	SFU	80	60	10
Total Phase 1 Upper Peštani Base	**4,30**			**200**	**33**

Typical Mountain Resort Single-Family Unit Development

Skier Service Program

Skier service facilities are those facilities which provide functions specifically related to the operation and management of the ski area. For planning purposes, these services can generally be broken down into three distinct categories:

Staging Facilities - those services that are required as skiers arrive at the area.

Commercial Facilities - those services required throughout the day as skiers are on the mountain and during après-ski hours.

Operational Facilities - those services not directly required by skiers but which are essential for the day-to-day operation of the ski area.

Staging facilities include ticket sales, public lockers, equipment rental and repair, ski school, and children's programs. These facilities are located in the base area and should be sized in relation to the number of visitors staging through the base area.

Commercial facilities are located both in the base area and on the mountain and include food and bar seating, kitchen and serving areas, restrooms and accessory retail space. Restaurant space in the base area does not always need to be owned by the mountain operator; however restaurants on the mountain are normally the responsibility of the mountain operator. Restaurant seats should be planned relative to the number of skiers circulating in the vicinity of the proposed restaurant sites. Kitchens and restrooms must be sized in proportion to the amount of seating proposed for each restaurant.

Operational facilities are generally "back of the house" services and include administration, employee lockers and ski patrol facilities. These facilities are located both on the mountain and in the base area.

"Design Day"

To assist in the planning of service facilities at the Galičica Ski Center, the number of skiers and sightseers that are anticipated to be on the mountain on a "Design Day" needs to be determined. The design day is chosen to represent the average business levels expected during the high season. This is not the "Peak Day" experienced during the season, as if facilities were designed for the peak day, they would be very under-utilized for the majority of the season. The "Design Day" typically represents 80% of the combined buildout ski area SCC and estimate of the number of non-skiers that will use the facility. For the Galičica Ski Center, the design day has been determined based on 80% of 3.500 visitors (3.000 skiers and 500 non-skiers).

Ecosign has developed a skier service program for the Galičica Ski Center based on standards of recommended floorspace per visitor. In the second column of, Table VIII.7 Ecosign's planning standards for the amount of skier service space recommended per skier for each of the 12 skier service functions at a typical Day Skier Area are listed. These standards have been developed over several years and incorporate data from resorts in Europe, North America and Asia. The Theoretical Recommended floorspace per skier is applied to the "Design Day" visitor capacity of 2.800 visitors to determine the total recommended floor space for each of the 12 skier services, as well as storage and circulation space within a building.

Four buildings have been planned as part of the master plan for the Galičica Ski Center; the Base Area Lodge, Mid-Mountain Lodge, Mountain Top Lodge and the Backside Lodge. Construction of the Base Area Lodge and the Mid-Mountain Lodge are included as part of Phase 1 development, however it was necessary to consider the ideal capacity of all proposed buildings within the master plan to ensure that the Phase 1 buildings are appropriately scaled for a balanced facilities at buildout. Table VIII.7 outlines the total recommended floor space for each of the 12 skier services, and a breakdown of the allocation of services between the four buildings. Staging facilities are planned in both the Base Lodge and the Mid-Mountain Lodge, while commercial and operational facilities are spread through all four buildings. The Base Area Lodge and Mid-Mountain Lodge planned in Phase 1 are described in detail below.

TABLE VIII.7
GALIČICA SKI CENTER
SKIER SERVICE PROGRAM

Buildout SCC + 500
Sightseers **3.500**
Design Day Capacity (80%) **2.800**

Guest Service Function	Theo. Recomm. m²/skier	Recomm. Floor Space m²	PHASE 1 Base Area Lodge	PHASE 1 Mid-Mountain Lodge	Mountain Top Lodge	Backside Lodge	Total Buildout
Staging Facilities							
Ticket Sales	0,09	252	252,0	-	-	-	252,0
Public Lockers	0,04	112	-	112,0	-	-	112,0
Equipment Rental & Repair	0,075	210	105,0	105,0	-	-	210,0
Restrooms for Staging	0,02	56	56,0	-	-	-	56,0
Guest Services/Snow Sport School	0,02	56	28,0	28,0	-	-	56,0
Children's Programs	0,02	56	-	56,0	-	-	56,0
Staging Subtotal	**0,265**	**742**	**441,0**	**301,0**	**-**		**742,0**
Commercial Facilities							-
Food & Beverage Seating	0,4	1.120	56,0	448,0	403,2	224,0	1.131,2
Kitchen & Scramble	0,15	420	21,0	168,0	151,2	84,0	424,2
Restrooms	0,08	224	11,0	89,6	67,2	56,0	223,8
Accessory Retail	0,05	140	20,0	100,0	10,0	10,0	140,0
Commercial Subtotal	**0,68**	**1.904**	**108,0**	**805,6**	**631,6**	**374,0**	**1.919,2**
Operational Facilities							-
Administration	0,025	70	35,0	17,5	17,5	-	70,0
Employee Facilities	0,02	56	28,0	14,0	14,0	-	56,0
First Aid & Mountain Patrol	0,02	56	-	19,0	19,0	19,0	57,0
Operations Subtotal	**0,07**	**182**	**63,0**	**50,5**	**50,5**	**19,0**	**183,0**
Total Net Functional Space	**1,01**	**2.828**	**612,0**	**1.157,1**	**682,1**	**393,0**	2.844,2
Storage (10%)	0,1	283	61,2	115,7	68,2	39,3	284,4
Mechanical/ Circulation/ Walls/ Waste	0,15	424	91,8	173,6	102,3	59,0	426,6
Total Building Floorspace	**1,260**	**3.535**	**765,0**	**1.446,4**	**852,6**	**491,3**	**3.555,2**

Base Area Lodge

The Base Area Lodge is located directly adjacent to the Lift 1a gondola bottom terminal (Figure VIII.2) on the east side of P1. This building provides the majority of the ski area's staging functions, as well as some commercial and operational facilities. Due the easy access and reduced construction costs for the Base Area Lodge relative to the on-mountain Lodges, some of the facilities that are typically provided on the mountain have been partially allocated to in this building. Ticket facilities, restrooms, guest services, rentals (50% of total), a café, small retail shop, office space and employee space has been planned in the Base Area Lodge. This building is designed on one level and connects with the gondola terminal building and chair storage. The main entrance is on the east side of the building adjacent to the drop-off area with a secondary entrance on the south side of the building. The Base area lodge is visible from the entrance to P1 and provides all the services necessary for visitors to start their day at Galičica Ski Center.

Mid-Mountain Lodge

The Mid-Mountain Lodge is the largest building planned within the ski area facility and is envisioned as the main "Day Lodge" for skiers and non-skiers. Facilities planned within the Mid-Mountain Lodge include rentals, lockers, ski school, children's programs, a cafeteria style restaurant, restrooms, a retail shop, ski patrol space, employee space and some office space. The building has a total gross floor area of 1.500m² which is planned over two full floors. Figure VIII.3 illustrates the location of the Mid-Mountain Lodge in relation to the gondola mid-station and other facilities in the Mid-Mountain Zone. The lodge has been located central to the beginner ski area, tubing zone and snow play facilities so guests can easily access all of the activities that are offered in the mid-mountain zone from the Lodge. The entrance to the lodge is located 125m to the west of the gondola loading platform on a level path that follows the upper edge of the beginner zone. The restaurant is planned on the second level of the building which creates an opportunity for a sunny patio with views of the ski terrain and Lake Ohrid on the south side of the building. A second outdoor seating area with a fire pit is planned at the base of the tubing hill which would provide a viewing area for tubing and the beginner area. From the Lodge, a pedestrian path extends to the west to a snow play and activity zone which could include a sledding area, children's ski area with walk-up carpets (non-mechanical), a mini-snowmobile track for children and a series of snow-related play toys for kids. Circulation between the gondola mid-station, Mid-Mountain Lodge and activity zones is designed with a hard surface for pedestrians as well as a snow surface for skiers or a potential snowmobile shuttle from the lodge to the snow play zone on the north side of the site (200m from the lodge).

Snowmobile Shuttle for Kids– Mid-Mountain Zone

Tubing Carousel– Mid-Mountain Zone

Walk Up Carpets and Sledding– Mid-Mountain Zone

Outdoor Picnic Area – Mid-Mountain Zone

Phase 1 Food Service Seating

In Phase 1, restaurant seating is planned in the Base Area Service Building at the bottom of the gondola and in the Mid-Mountain Lodge. The capacity of food service establishments to provide lunch and other snacks to skiers is calculated by assuming a typical turnover of 3 people per seat.

The Mid-Mountain Lodge has the largest restaurant capacity with 373 indoor seats which can serve a total of 1.120 guests at three turns per seat. The restaurant in the mid-mountain lodge is envisioned as a cafeteria style restaurant with a large "scramble" zone where guests can choose from various meal options. An outdoor BBQ is also a possibility for the patio space on the south side of the mid-mountain lodge.

A smaller café-style food service venue is envisioned for the Base Area Service Building, with a total of approximately 50 indoor seats. This café will provide coffee and snacks to visitors during the morning staging period and at the end of the day. It is not anticipated that skiers will eat at the Base Area Service Building for lunch in the middle of the ski day.

Table VIII.8 provides a summary of the food service seating capacity in Phase 1 of the Galičica Ski Center.

TABLE VIII.8
GALIČICA SKI CENTER
FOOD SERVICE SEATING PROGRAM

	No. Indoor Seats	No. Turns per Seat	No. Guests Served
Base Area Service Building	47	3	141
Mid-Mountain Lodge	373	3	1.119
Total Phase 1	**420**		**1.260**

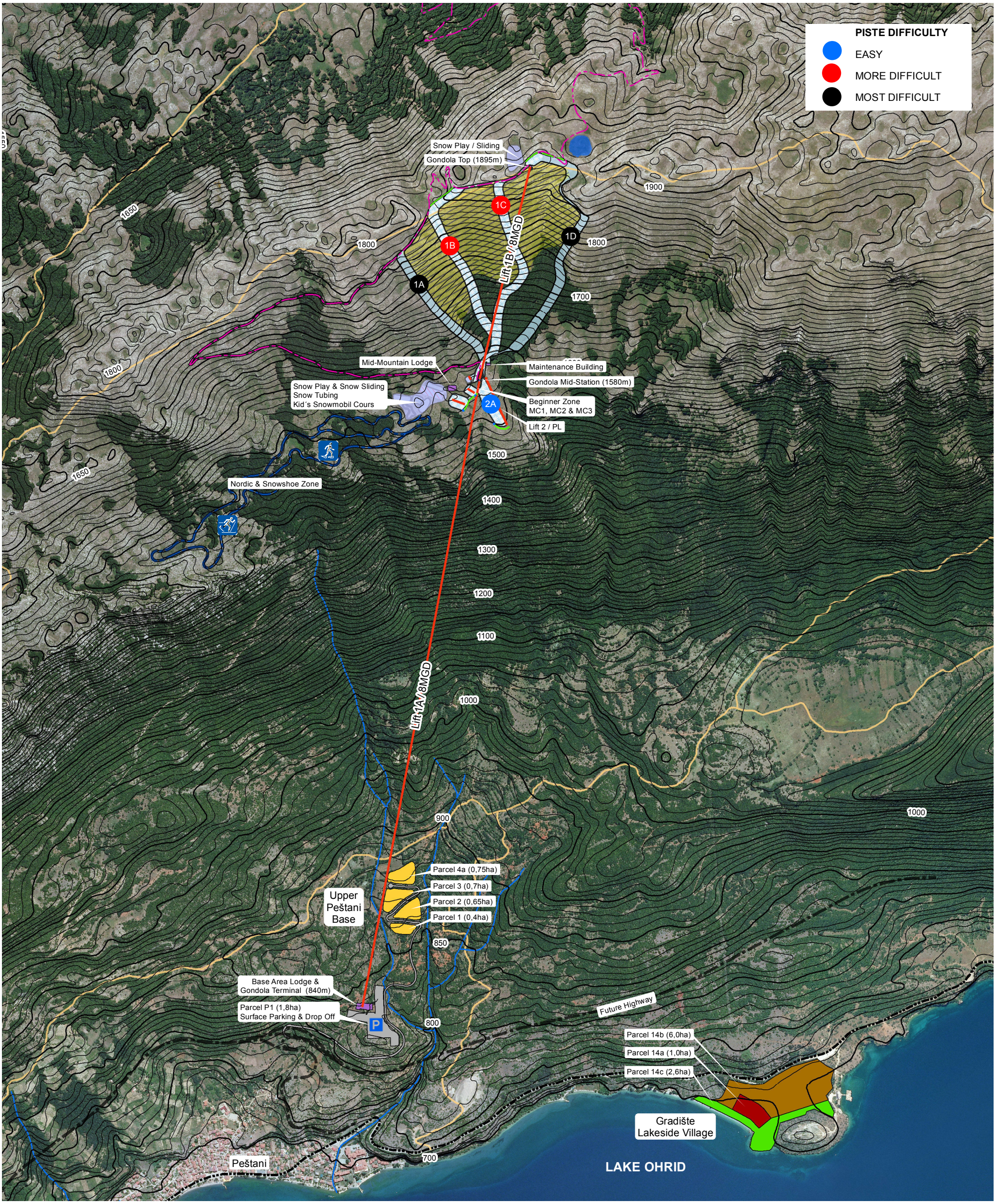
Outdoor BBQ – Mountain Top Viewing Platform & Mid-Mountain Zone

Phase 1 Base Capacity

Base capacity in Phase 1 is derived almost exclusively from parking, as the 33 single-family units will generate a very limited number of skiers from beds. The Phase 1 Base capacity is summarized in Table VIII.9 and reflects the parking capacity of P1 of 1.604 visitors. The ski area facility in Phase 1 has a total capacity of 880 skiers, with an additional 300 sightseers and non-skiers anticipated in this phase. Therefore, the base capacity in Phase 1 exceeds the ski area capacity, allowing for room for additional growth beyond Phase 1.

TABLE VIII.9
GALIČICA SKI CENTER
PHASE 1 BASE CAPACITY

PHASE 1	**No. Visitors**
Visitors from Accommodation	10
Visitors from Parking	1.604
Total Upper Peštani Base Capacity	**1.614**
Phase 1 SCC	880
Sightseers/Snow Players/Nordic	300
Total Mountain Capacity	**1.180**



GALIČICA
NATIONAL PARK

Date: 04/2014

Contours: 10 meters

Scale 1:15.000 (for A3 printout)

0 125 250 500 m

LEGEND

- PROPOSED LIFT
- EXISTING PATH
- PROPOSED CONSTRUCTION ROAD
- SNOW FENCE
- SAFETY FENCE
- NORDIC TRAIL
- PROPOSED PISTE
- PISTE WITH SNOWMAKING
- FREERIDE AREA
- PARKING/ACCESS ROAD
- PROP. SERVICE BUILDING
- SINGLE FAMILY UNITS
- SNOWMAKING POND
- SNOW PLAY ZONE
- HOTEL/VILLAGE
- MFU / APARTMENTS
- PUBLIC GREEN SPACE/PICNIC AREA

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Figure VIII.1

GALIČICA SKI CENTER MASTER PLAN - PHASE 1

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Contour Interval: 2.5 meters
Date: 05/2014
1:2000 at A3 Print

0m 20 40 60 80 100

LEGEND

Proposed Lifts

Paved Road / Parking

Pedestrian Zone/Path

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Soil conditions must be assessed by a qualified professional prior to detailed design. Cut and fill slope angles of repose may need to be adjusted based on the confirmed soil conditions (for conceptual purposes, Ecosign has assumed that all cut and fill banks will have a slope ranging from 1.5:1 to 1:1). Procedures for the placement of fill and compaction methods must be approved by a local Engineer. Drainage systems must be designed by a local Engineer for all proposed construction.

Proposed off-ramp and intersection with future highway. To be evaluated and designed in detail by a highway engineer.

Base Area Service Building
Footprint = 765m²
Level 1 = 840m

Gondola Terminal
Load = 840m

Gondola Cabin
Storage

Proposed access road to Phase 1 real estate.

Lot P1
1.8 Ha.
594 Cars

Drop Off

Picnic Area / Viewpoint

P1

Views to Lake Ohrid

Proposed future highway

Proposed base area access road from future highway.

GALIČICA SKI CENTER GONDOLA TERMINAL & PARKING - PHASE 1 Fig.VIII.2

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Date: 05/2014
1:2000 at A3 Print

0m 20 40 60 80 100

LEGEND

- Proposed Lifts
- Ski Trails
- Snow Play / Sledding
- Nordic Ski Trails
- Mini Snowmobile
- Pedestrian Circulation
- Proposed Construction Road
- Safety Fence

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Sledding/Snow Play Area
Mini Snowmobile Track (approx. 200m)
Children's Learning Area Walk-Up Carpets
Snow Tubing 90m long; 5x3m Lanes
Sledding
Mid-Mountain Lodge Footprint = 750m²
Level 1 = 1.581m
Level 2 = 1.584m
Restaurant Patio Level 2
Snow Play/ Learning Area
Maintenance Building Footprint = 150m²
Mid-Statiom Load = 1580m
Stairs down
Nordic Ski Trails
Viewing Area with Picnic Tables Firepit & BBQ
7m wide Pedestrian Walkway 3m Paved surface; 4m snow surface for possible snowmobile sled transport to Play Zone & access to Nordic ski trails.
Children´s Snow Play Zone: Snow Castle, Toys, Snow Playground, etc.
Picnic & Viewing Area with Firepit

1A 1B 1C 1D 2A 6A 7A

Lift 1A / 8M/GD
Lift 2 / PL

GALIČICA SKI CENTER MID-MOUNTAIN ZONE - PHASE 1 Fig.VIII.3

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0m 20 40 60 80 100

LEGEND

- Proposed Lifts
- Ski Trails
- Proposed Construction Road
- Pedestrian Circulaiton

Snow Play / Sledding Zone
Summer Hiking Trail
10% Skiway
Views to Lake Prespa
Gondola Top Load = 1.895m
Operator Hut
Temporary Viewing Platform (Phase 1 Only) Elevation = 1.895m
Views to Lake Ohrid
Snowmaking Pond Water Elevation = 1.870m
10% Skiway
1B
1C
1D
Lift 1B / 8MGD

Snow Fence

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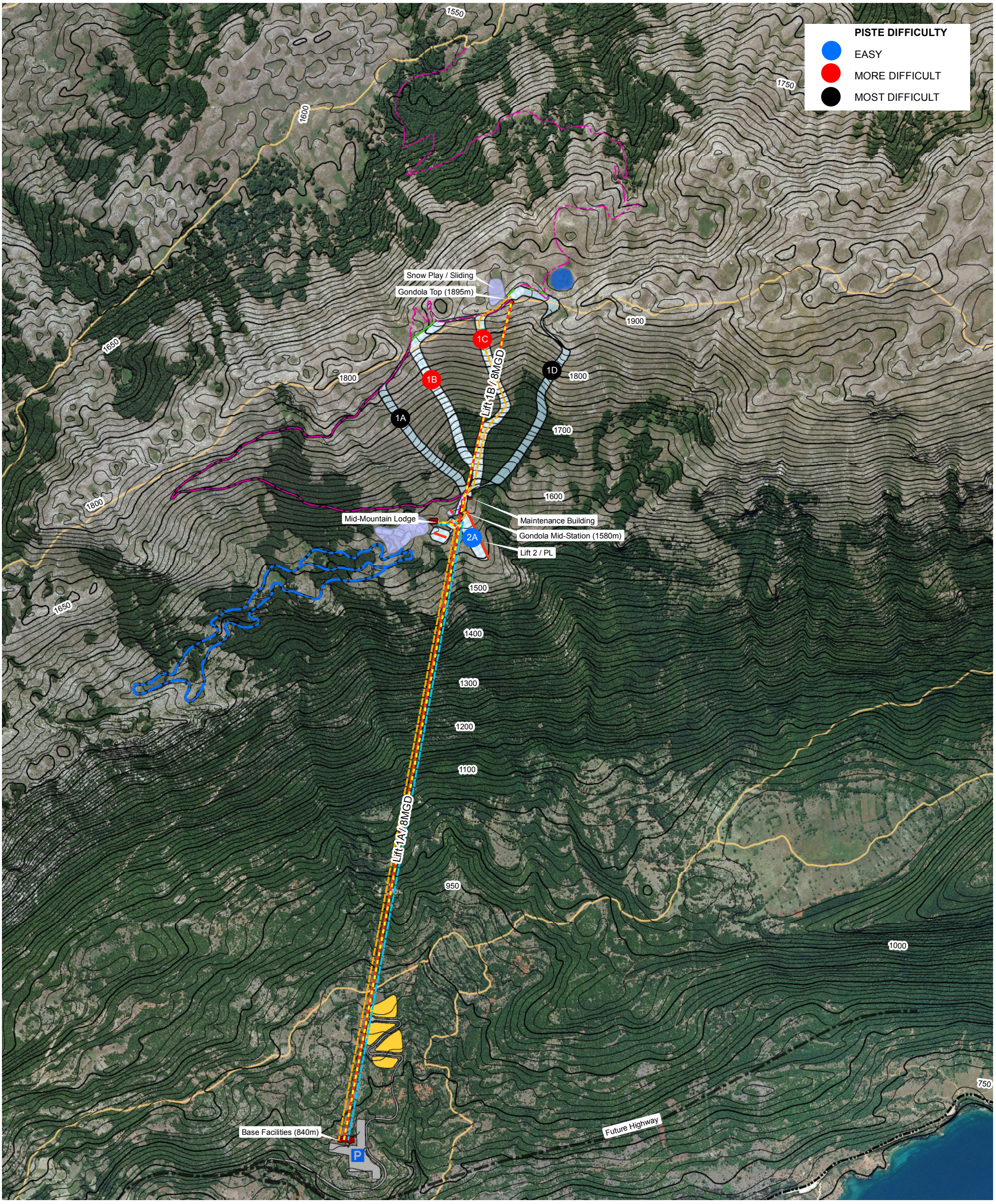
GALIČICA SKI CENTER GONDOLA TOP ZONE - PHASE 1 Fig.VIII.4



GALIČICA
NATIONAL PARK

Date: 04/2014

Contours: 10 meters

Scale 1:15.000 (for A3 printout)

0 125 250 500 m

LEGEND

- EXISTING PAVED ROAD
- EXISTING PATH
- PROPOSED LIFT
- PROPOSED WATER PIPES
- PROPOSED POWER LINE
- PROPOSED COMMUNICATION LINE
- SNOW FENCE
- CONSTRUCTION ROAD
- NORDIC TRAIL
- PROPOSED PISTE
- SURFACE PARKING
- PROPOSED BUILDINGS
- SINGLE FAMILY UNITS

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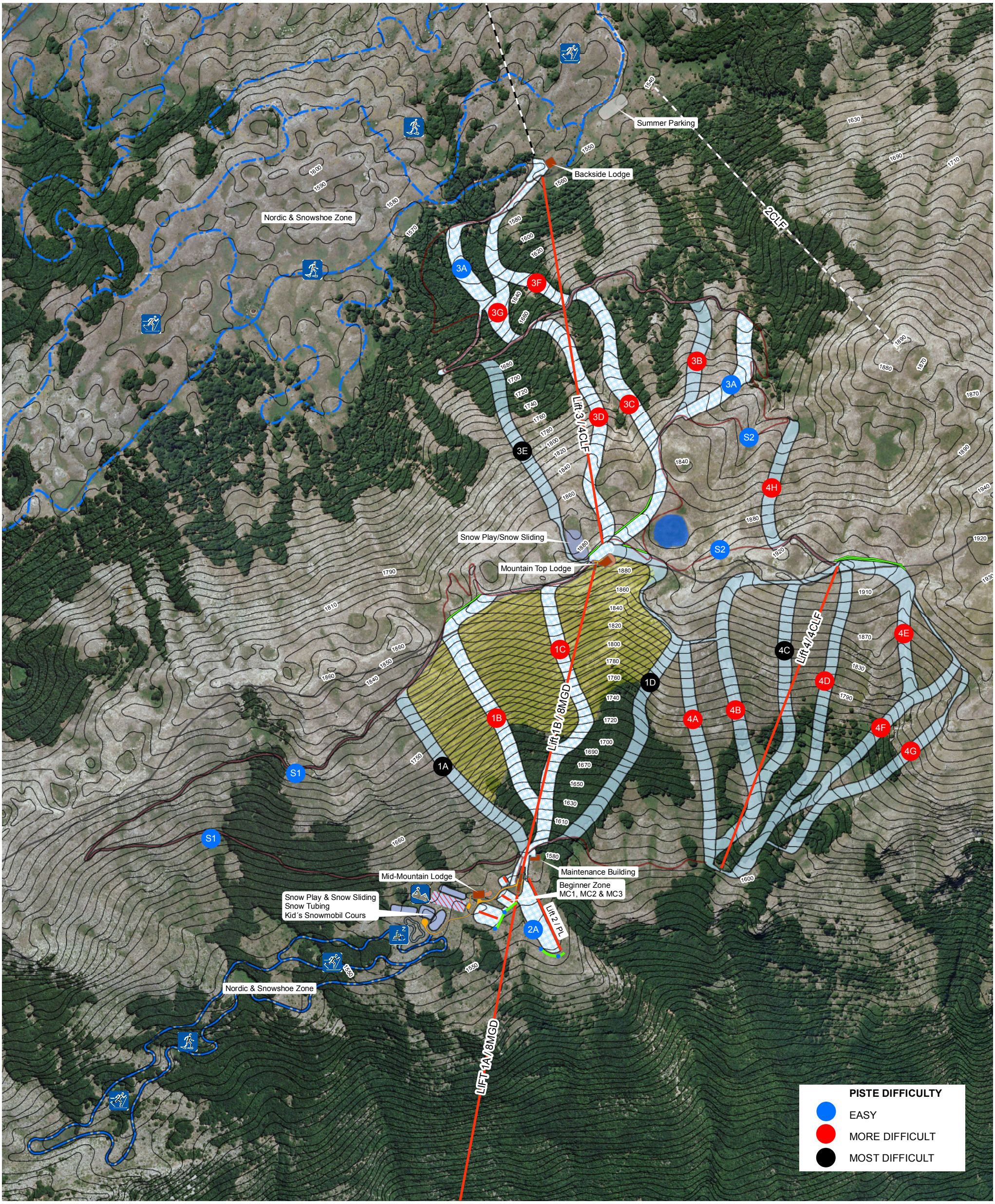
Figure VIII.5

GALIČICA SKI CENTER MOUNTAIN INFRASTRUCTURE PLAN - PHASE 1



GALIČICA
NATIONAL PARK

Date: 05/2014

Contours: 10 meters

Scale 1:10.000 (for A3 printout)

0 100 200 400 m

LEGEND

- PROPOSED LIFT
- OTESHEVO CONNECTOR
- EXISTING LIFT OUT OF SERVICE
- PROPOSED CONSTRUCTION ROAD
- EXISTING PATH
- SNOW FENCE
- SAFETY FENCE
- NORDIC TRAIL
- PROPOSED PISTE
- FREERIDE AREA
- PISTE WITH SNOWMAKING
- SNOWMAKING POND
- SNOW PLAY ZONE

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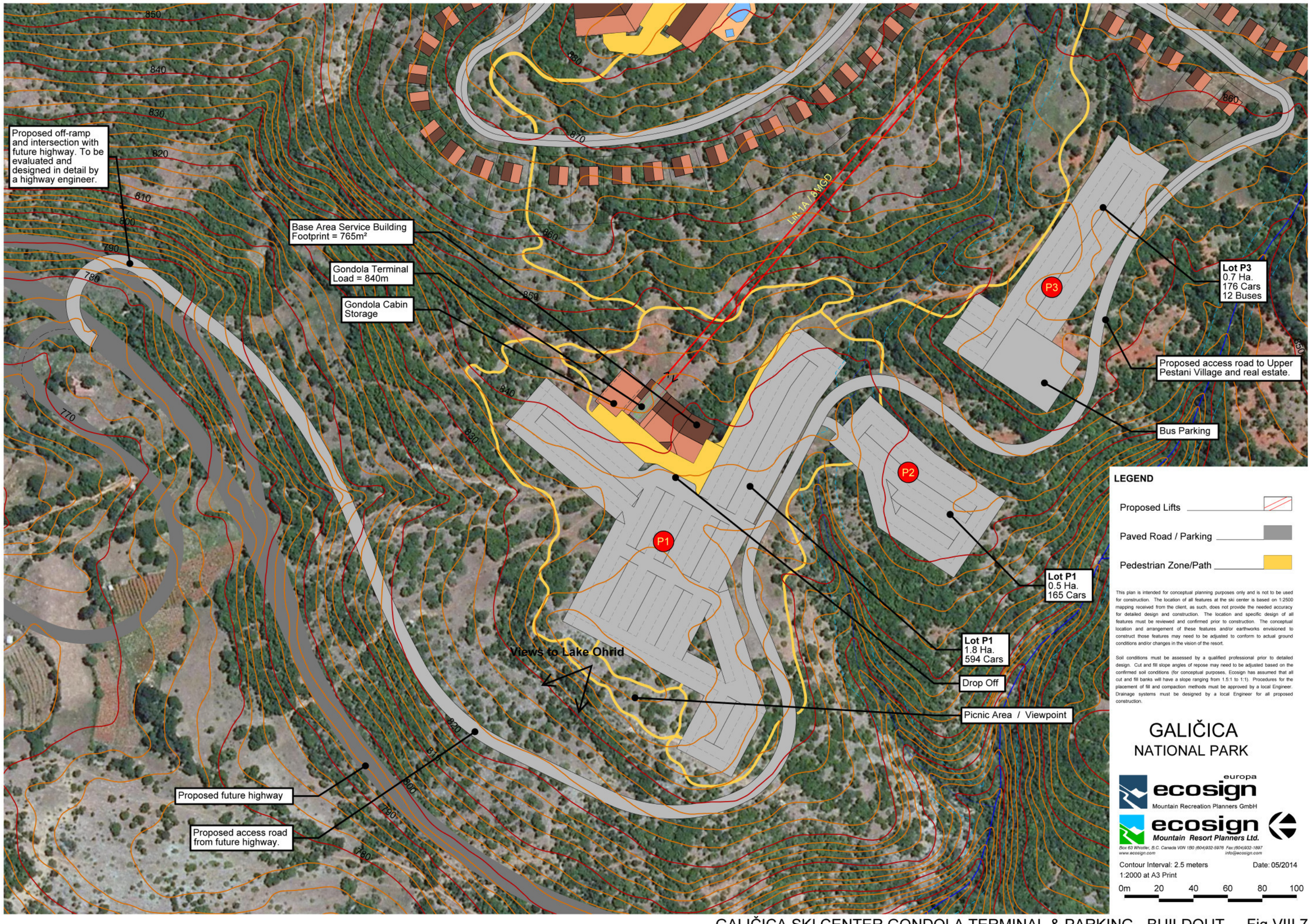
Figure VIII.6

GALIČICA SKI CENTER MOUNTAIN MASTER PLAN - BUILD-OUT



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Contour Interval: 2.5 meters
Date: 05/2014
1:2000 at A3 Print

0m 20 40 60 80 100

GALIČICA SKI CENTER GONDOLA TERMINAL & PARKING - BUILDOUT Fig.VIII.7

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Contour Interval: 2.5 meters
Date: 05/2014
1:2000 at A3 Print

0m 20 40 60 80 100

LEGEND

- Proposed Lifts
- Ski Trails
- Snow Play / Sledding
- Nordic Ski Trails
- Mini Snowmobile
- Pedestrian Circulation
- Proposed Construction Road
- Safety Fence

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Sledding/Snow Play Area
Mini Snowmobile Track (approx. 200m)
Children's Learning Area Walk-Up Carpets
Snow Tubing 90m long; 5x3m Lanes
Sledding
Mid-Mountain Lodge 2 Levels, Footprint = 750m²
Snow Play/ Learning Area
Maintenance Building Footprint = 300m²
Mid-Statopm Load = 1580m
Nordic Ski Trails
Viewing Area with Picnic Tables Firepit & BBQ
Children´s Snow Play Zone: Snow Castle, Toys, Snow Playground, etc.
7m wide Pedestrian Walkway 3m Paved surface; 4m snow surface for possible snowmobile sled transport to Play Zone & access to Nordic ski trails.
Picnic & Viewing Area with Firepit

1A 1B 1C 1D 2A 6A 7A

Lift 1A / 8M/SD
Lift 2 / PL

GALIČICA SKI CENTER MID-MOUNTAIN ZONE - BUILDOUT Fig.VIII.8

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Contour Interval: 2.5 meters
Date: 05/2014

0m 10 20 30 40 50

LEGEND

- Proposed Lifts
- Ski Trails
- Proposed Construction Road
- Pedestrian Circulaiton
- Snow Fence

Ski Trail Ability Level

- Easy
- More Difficult
- Most Difficult

3E
3D
3C
1C
1D
S2
Snow Play / Sledding Zone
Lift 3 / 4CLF
Operator Hut
Mountain Top Lodge
Footprint = 600m²
G.F.A = 850m²
Snowmaking Pond
Water Elevation = 1.870m
Views to Lake Prespa
Views to Lake Ohrid
Operator Hut
Gondola Top Load = 1.895m
Lift 1B / 8MGD
1880
1890
1895
1870
1860
1850
1840
1865

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GALIČICA SKI CENTER GONDOLA & LIFT 3 TOP - PHASE 3 Fig.VIII.9

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Contour Interval: 2.5 meters Date: 05/2014

0m 10 20 30 40 50

LEGEND

- Proposed Lifts
- Ski Trails
- Proposed Construction Road
- Nordic & Snowshoeing Trail

Ski Trail Ability Level

- Easy
- More Difficult
- Most Difficult

Nordic Skiing and Snowshoeing Trail

Lift 5 / 8MGD

Lift 3 / 4CLF

Backside Lodge

Lift 3 Loading at 1560m

3A

1575 1570 1565 1562,5 1560 1557,5 1572,5 1567,5 1570 1580 1590

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GALIČICA SKI CENTER LIFT 3 BOTTOM - BUILDOUT Fig.VIII.10

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Contour Interval: 2.5 meters Date: 05/2014

0m 10 20 30 40 50

LEGEND

- Proposed Lifts
- Ski Trails
- Proposed Construction Road
- Pedestrian Circulaiton
- Snow Fence

Ski Trail Ability Level

- Easy
- More Difficult
- Most Difficult

S2
4B
4C
4D
4E
10% Skiway
Unload Lift 4 = 1933m
Operator Room
Lift 4 / 4CLF
1920
1910
1925
1930
1900
1890
1870

GALIČICA SKI CENTER LIFT 4 TOP - PHASE 3 Fig.VIII.11

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Contour Interval: 2.5 meters

Date: 05/2014

0m 10 20 30 40 50

LEGEND

Proposed Lifts

Ski Trails

Proposed Construction Road

Ski Trail Ability Level

Easy

More Difficult

Most Difficult

4A 4B 4C 4D 4F 4G

1660 1650 1640 1630 1620 1610 1600 1590

Lift 4 / 4CLF

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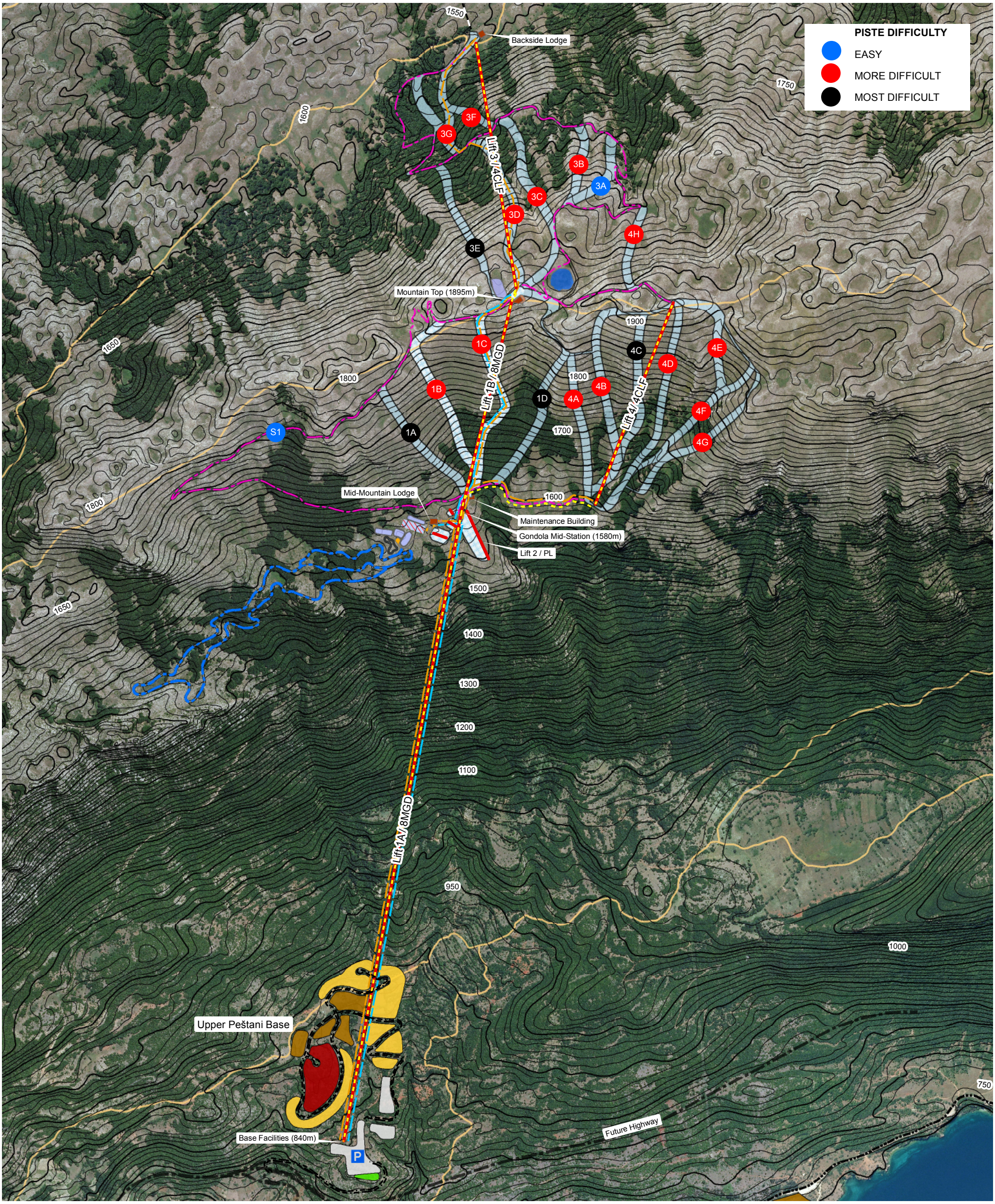
GALIČICA SKI CENTER LIFT 4 BOTTOM - PHASE 3 Fig.VIII.12



GALIČICA
NATIONAL PARK

Date: 05/2014

Contours: 10 meters

Scale 1:15.000 (for A3 printout)

0 125 250 500 m

LEGEND

- EXISTING PAVED ROAD
- EXISTING PATH
- OTESHEVO CONNECTOR
- PROPOSED LIFT
- PROPOSED POWER LINE
- PROPOSED WATER & SEWER PIPES
- PROPOSED COMMUNICATION LINE
- PROPOSED CONSTRUCTION ROAD
- PROPOSED PISTE

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Figure VIII.13

GALIČICA SKI CENTER MOUNTAIN INFRASTRUCTURE PLAN - BUILD-OUT

IX. CAPITAL BUDGET – MASTER PLAN

.1 Order of Magnitude Capital Budget

The Capital Budget for the Galičica Concept Plan is very important in evaluating the economic viability of the concept that has been prepared. The objective of this analysis is to determine the "Order of Magnitude" (OoM) capital costs for the development concept. Throughout the development of the Galičica Plan, there has been interaction between financial and resort planners. As various sub-projects were identified, a capital cost was estimated and added to the capital budget. Following MEPSO's inputs in the Annex 1 to the Contract dated 30.10.2013 and further instructions, Ecosign has met with MEGA KL to obtain updated unitary costs for the local content as well as changes arising from the Master Plan which are reflected in this updated version of the Capital Budget.

The alpine ski area development for the Galičica Concept Plan envisions the development of a ski facility and a year-round sightseeing attraction for the regional and destination markets. The estimated capital costs for the ski facility and sightseeing gondola have been broken into ten project accounts generally accepted by the ski industry. Within each of the major accounts, sub-project accounts have been costed out either as a lump sum or, where appropriate, on a per unit basis. The majority of the capital cost estimates are based on construction and/or installation costs experienced by other ski areas in Europe, on unit costs supplied by the client, lump sum estimates or on manufacturers' budgetary estimates. All capital costs are estimated in 2013 Euros. We have also listed three potential development phases with Skier Carrying Capacities of 880 skiers, 1.990 skiers and 3.000 skiers.

The order of magnitude capital budget has been prepared given the following assumptions.

Pre-Development Planning - #01

All costs associated with the Galičica Master Planning process including planning and design, surveying and mapping of the facility are in this account for the concept and listed in Table IX.1. Engineering costs are based on two percent of capital cost of roads, sewage, water, parking, site works and electrical supply according to suggestion from MEPSO. Architecture fees are based on € 10 per square metre of total building space and include architectural design and structural/mechanical engineering of the buildings and we have also included a revised lump sum amount for basic environmental studies according to input from MEGA KL, with revision by MEPSO.

TABLE IX.1
GALIČICA
PREDEVELOPMENT COSTS

Account	#	Units	Unit Price	Qty	Phase 1	Qty	Phase 2	Qty	Build-out	Total
PRE-DEVELOPMENT	**1**									
Surveying and Mapping		lump sum	€ 50.000	1	€ 50.000	0	€ 0	0	€ 0	€ 50.000
Planning & Design		lump sum	€ 350.000	1	€ 350.000	0	€ 0	0	€ 0	€ 350.000
Engineering		Acct. 5 & 6		2%	€ 94.000	2%	€ 7.000	2%	€ 15.000	€ 116.000
Architecture		Acct. 2, sq.m.	€ 10	2.415	€ 24.200	925	€ 9.300	75	€ 800	€ 34.300
Environmental Studies		lump sum	€ 50.000	1	€ 50.000	0	€ 0	0	€ 0	€ 50.000
PRE-DEVELOPMENT TOTAL					**€ 568.200**		**€ 16.300**		**€ 15.800**	**€ 600.300**

Building Development - #02

The building costs include the cost for the development of buildings that are directly required for the operation of the ski area, as listed in Table IX.2. The skier service facilities have been designed to a destination area level of finish at an estimated cost from MEGA KL of €660 per square metre for buildings constructed in the base area, €710 per square metre for buildings constructed at mid-mountain and €760 on the mountain top, to reflect the additional cost of transporting material. The maintenance buildings have been adjusted proportionally and are now costed at €500 per square meter.

Furniture, Fixtures and Equipment (F, F. & E.) are estimated at 25 percent of the base, mid and mountain top lodge costs. The F, F & E includes all kitchen equipment, restaurant small wares, furniture, cabinets and fixtures, as well as floor and wall coverings.

TABLE IX.2
GALIČICA
BUILDING COSTS

Account	#	Units	Unit Price	Qty	Phase 1	Qty	Phase 2	Qty	Build-out	Total
BUILDINGS	**2**									
Base Lodge		sq.m.	€ 660	765	€ 504.900	0	€ 0	0	€ 0	€ 504.900
Mid Mtn. Lodge		sq.m.	€ 710	1.500	€ 1.065.000	0	€ 0	0	€ 0	€ 1.065.000
Mtn. Top Lodge		sq.m.	€ 760	0	€ 0	850	€ 646.000	0	€ 0	€ 646.000
Backside Lodge		sq.m.	€ 760	0	€ 0	0	€ 0	500	€ 380.000	€ 380.000
Maintenance Facility		sq.m.	€ 500	150	€ 75.000	75	€ 37.500	75	€ 37.500	€ 150.000
F. F. & E. (Lodges only)		Acct. 2		25%	€ 392.500	25%	€ 161.500	25%	€ 95.000	€ 649.000
BUILDINGS TOTAL					**€ 2.037.400**		**€ 845.000**		**€ 512.500**	**€ 3.394.900**

Lifts - #03

We have assumed that all ski lifts will be new equipment to be installed by the manufacturer on a "Turn-Key" basis. The estimated costs provided are budget estimates based on a preliminary price estimate from Doppelmayr and costs from previous projects. The lift costs include all lift related equipment and structures including lift superstructures, concrete footings and foundations, "turn-key" installation, load testing and acceptance. We have estimated that Operators Huts will cost €20.000 per lift. Lift terminal grading has been estimated to cost €20.000 per lift terminal on average. Based on the input from MEGA KL for grading work to be costed at € 4-5/m³, the grading work costs can be refined in future as details

become available for implementation projects. The capital cost estimates for ski lifts are listed in Table IX.3. It should be noted that the existing abandoned double chairlift and T-bar do not conflict with the proposed new development and, as such, no funds have been allocated for the removal of these two lifts as part of the Master Planning. In a Detail Planning process for Phase 2, we recommend to define together with the stakeholders if these installations are to remain in the National Park or not and if they are to be removed as part of this project. Following suggestion by MEPSO, the cost of the gondola storage building has been adjusted to €710 per square metre.

TABLE IX.3
GALIČICA
LIFT COSTS

Account	#	Units	Unit Price	Qty	Phase 1	Qty	Phase 2	Qty	Build-out	Total
SKI LIFTS	**3**									
NEW LIFTS										
Lift 1 - 8-MGD - 1800 pph		lump sum	€ 10.900.000	1	€ 10.900.000	0	€ 0	0	€ 0	€ 10.900.000
Add-on for Lift 1 recovery concept		lump sum	€ 600.000		€ 0	0	€ 0	1	€ 600.000	€ 600.000
Gondola Storage Building		m³	€ 710	640	€ 454.400	0	€ 0	0	€ 0	€ 454.400
Lift 2 - PL - 600 pph		lump sum	€ 200.000	1	€ 200.000	0	€ 0	0	€ 0	€ 200.000
Lift 3 - 4CLF - 1500 pph		lump sum	€ 2.800.000		€ 0	1	€ 2.800.000	0	€ 0	€ 2.800.000
Lift 4 - 4CLF - 1600 pph		lump sum	€ 2.700.000		€ 0	0	€ 0	1	€ 2.700.000	€ 2.700.000
Lift 5 - 8-MGD - 1200 pph		lump sum	€ 12.800.000	0	€ 0	0	€ 0	0	€ 0	€ 0
Gondola Storage Building		m³	€ 710	0	€ 0	0	€ 0	0	€ 0	€ 0
MC1 - SL 55m / 1200 pph		lump sum	€ 66.000	1	€ 66.000	0	€ 0	0	€ 0	€ 66.000
MC2 - SL 35m / 1200 pph		lump sum	€ 49.000	1	€ 49.000	0	€ 0	0	€ 0	€ 49.000
MC3 - SL 20m / 1200 pph		lump sum	€ 37.000	1	€ 37.000	0	€ 0	0	€ 0	€ 37.000
Tubing MC - SL 81m / 1200 pph		lump sum	€ 100.000	1	€ 100.000	0	€ 0	0	€ 0	€ 100.000
Operator Huts		per terminal	€ 20.000	5	€ 100.000	2	€ 40.000	2	€ 40.000	€ 180.000
Lift Terminal Grading		per terminal	€ 20.000	9	€ 180.000	2	€ 40.000	2	€ 40.000	€ 260.000
Lift Line Clearing		linear meters	€ 50	2.088	€ 104.400	534	€ 26.700	265	€ 13.300	€ 144.400
SKI LIFTS TOTAL					**€ 12.190.800**		**€ 2.906.700**		**€ 3.393.300**	**€ 18.490.800**

Ski Pistes - #04

The general ski piste development cost has been estimated at an average of €5.000/ha, this includes re-vegetation of slopes where timber removal or grading has taken place. Timber removal from the ski pistes is estimated at €2.000/ha following suggestion from MEPSO. Several ski-ways have been designed to move skiers from one part of the ski area to another. The ski-way construction is estimated at €200 per lineal meter to create a skiway with an 8-meter wide running surface with a constant 10 percent slope gradient. These skiways are constructed so that the running surface is suitable as part of the mountain technical road used for construction and maintenance of the on mountain facilities. A lump sum of €100.000, at build-out, has been allocated for major piste grading projects. Based on the input from MEGA KL for grading work to be costed at € 4-5/m³, the grading work costs can be refined in future as details become available for implementation projects. As requested by MEPSO, we have added lumps sum estimates for a Children's Mini Z snowmobile course, a playground and teaching area animation and facilities. A lump sum of €5.000.000 has been allocated for a Snowmaking distribution systems based on discussions with TechnoAlpin.

TABLE IX.4
GALIČICA
SKI PISTE COSTS

Account	#	Units	Unit Price	Qty	Phase 1	Qty	Phase 2	Qty	Build-out	Total
PISTES	**4**									
Ski Piste Development		ha.	€ 5.000	13,6	€ 68.200	16,4	€ 82.100	18,5	€ 92.300	€ 242.600
Ski-Way Construction		linear meters	€ 200	772	€ 154.400	2.032	€ 406.400	1.247	€ 249.400	€ 810.200
Ski Piste Timber Removal incl. Stumps		ha.	€ 2.000	6,60	€ 13.200	6,4	€ 12.800	3,5	€ 7.000	€ 33.000
Piste Grading		lump sum	€ 100.000	0,50	€ 50.000	0	€ 25.000	0,25	€ 25.000	€ 100.000
Tube Hill Grading		lump sum	€ 15.000	1,00	€ 15.000	0	€ 0	0	€ 0	€ 15.000
Children's Mini Z snowmobile course		lump sum	€ 20.000	1	€ 20.000	0	€ 0	0	€ 0	€ 20.000
Mountain Bike Trail Construction		lump sum	€ 60.000	1	€ 30.000	0,25	€ 15.000	0,25	€ 15.000	€ 60.000
Children's Playground		lump sum	€ 20.000	1	€ 20.000	0	€ 0	0	€ 0	€ 20.000
Children's Teaching Area Anim.+Facilities		lump sum	€ 20.000	1	€ 20.000	0	€ 0	0	€ 0	€ 20.000
Snowmaking System		lump sum	€ 5.000.000		€ 0	0	€ 0	1	€ 5.000.000	€ 5.000.000
SKI PISTE TOTAL					**€ 390.800**		**€ 541.300**		**€ 5.388.700**	**€ 6.320.800**

Roads and Parking - #05

On-mountain access roads used for the construction of the lifts and pistes are typically gravel surfaced with a slope gradient not exceeding ten percent and a road bed width of seven to eight metres. An uphill ditch with culverts placed at a suitable interval is required to provide positive drainage from the slopes above the road. The on-mountain access roads are made up of two basic types. Some of the existing roads are suitable to access the mountain for both lift and ski piste construction, as well as ongoing maintenance of the facilities. Following suggestion from MEPSO, we reduced the estimated the cost of the mountain technical road to €75 per lineal meter and of the paved access road to €402,50 per lineal meter. The proposed parking lot is accessed directly from the existing road along the east side of Lake Ohrid (R-501). The parking area will consist of a gravel surface parking lot, gondola terminal and service building. We estimated that this parking lot will average €800 per stall which is in line with the costing from MEGA KL of €25-30 per square meter for paved parking. Lump sum cost estimates for site works and grading at the base, mid-mountain and mountain top areas are also included in this account. Based on the input from MEGA KL for grading work, the costs can be refined in future as details become available for implementation projects. The capital cost estimates for roads and parking are listed in Table IX.5.

TABLE IX.5
GALIČICA
ROADS AND PARKING COSTS

Account	#	Units	Unit Price	Qty	Phase 1	Qty	Phase 2	Qty	Build-out	Total
PARKING, ROADS & SITE WORK	**5**									
Mountain Construction Access Roads		lineal metres	€ 75,0	6.650	€ 498.800	0	€ 0	1.240	€ 93.000	€ 591.800
Access Road to Base Day Skier Parking		lineal metres	€ 402,5	750	€ 301.900	75	€ 30.200	300	€ 120.800	€ 452.900
Paved Surface Parking at Base - Cars		stalls	€ 800	594	€ 475.200	165	€ 132.000	231	€ 184.800	€ 792.000
Mountain Top Site Works		lump sum	€ 75.000	1	€ 75.000	0	€ 0	0	€ 0	€ 75.000
Mid Mountain Site Works		lump sum	€ 200.000	1	€ 200.000	0	€ 0	0,25	€ 50.000	€ 250.000
Camping Site Works		lump sum	€ 15.000	0	€ 0	1	€ 15.000	0	€ 0	€ 15.000
Ohrid Base Site Works		lump sum	€ 75.000	1	€ 75.000	0	€ 0	0	€ 0	€ 75.000
Prespa Base Site Works		lump sum	€ 75.000	0	€ 0	0	€ 0	0	€ 0	€ 0
PARKING, ROADS TOTAL					**€ 1.625.900**		**€ 177.200**		**€ 448.600**	**€ 2.251.700**

Utilities - #06

Lump sum estimates have been made for base area and mountain top infrastructure including electrical supply, potable water supply and sewage disposal systems. Following input from MEPSO on the cost of a 20kV power supply line (supply and installation - according EVN), suitable for the specified 1,85MW peak demand, which is approx. € 80.000/km, we have estimated preliminary costs for the electrical distribution which need to be confirmed by MEPSO in the Master Planning stage for the planned concept. Following request from MEPSO, we have added the cost of two 1 kVA generator sets for backup power supply at a cost of €200.000 each, estimated form other projects. Utilities cost estimates are listed in Table IX.6.

TABLE IX.6
GALIČICA
UTILITIES COSTS

Account	#	Units	Unit Price	Qty	Phase 1	Qty	Phase 2	Qty	Build-out	Total
UTILITIES	**6**									
Mountain Top Water & Sewer		lump sum	€ 500.000	1	€ 500.000	0	€ 0	0	€ 0	€ 500.000
Mid Mountain Water & Sewer		lump sum	€ 750.000	1	€ 750.000	0	€ 0	0,2	€ 150.000	€ 900.000
Base Water & Sewer		lump sum	€ 500.000	1	€ 500.000	0	€ 0	0	€ 0	€ 500.000
Mtn. Top Lodge Transf. & Switch Gear		lump sum	€ 75.000	1	€ 75.000	0	€ 0	0	€ 0	€ 75.000
Mid Mtn. Lodge Transf. & Switch Gear		lump sum	€ 75.000	1	€ 75.000	0	€ 0	0	€ 0	€ 75.000
Base Lodge Electrical Supply		lump sum	€ 100.000	1	€ 100.000	0	€ 0	0	€ 0	€ 100.000
Base Lodge Transf. & Switch Gear		lump sum	€ 75.000	1	€ 75.000	0	€ 0	0	€ 0	€ 75.000
On-Mountain Electrical Distribution 20kV		per km	€ 80.000	4	€ 320.000	1	€ 80.000	1	€ 80.000	€ 480.000
1 kVA Generator sets for backup power		lump sum	€ 200.000	2	€ 400.000	0	€ 0	0	€ 0	€ 400.000
Lift Switch Gear/Transformer & Service		per lift	€ 75.000	4	€ 300.000	1	€ 75.000	1	€ 75.000	€ 450.000
UTILITIES TOTAL					**€ 3.095.000**		**€ 155.000**		**€ 305.000**	**€ 3.555.000**

Vehicles and Equipment - #07

All of the sub-accounts under this category are self-explanatory and based on costs experienced at other ski areas or manufacturers' prices, as shown in Table IX.7. In line with the request to add a snowmobile track for children, we have added 4 children's snowmobiles.

TABLE IX.7
GALIČICA
VEHICLES AND EQUIPMENT COSTS

Account	#	Units	Unit Price	Qty	Phase 1	Qty	Phase 2	Qty	Build-out	Total
VEHICLES & EQUIPMENT	**7**									
Grooming Machines - Regular Cat		per vehicle	€ 235.000	1	€ 235.000	1	€ 235.000	0	€ 0	€ 470.000
Grooming Machines - Winch Cat		per vehicle	€ 350.000	1	€ 350.000	0	€ 0	1	€ 350.000	€ 700.000
Snowmobiles		per vehicle	€ 12.000	2	€ 24.000	2	€ 24.000	2	€ 24.000	€ 72.000
Children's Mini Z Snowmobiles		per vehicle	€ 3.000	4	€ 12.000	0	€ 0	0	€ 0	€ 12.000
4x4 ATV		per vehicle	€ 12.000	1	€ 12.000	0	€ 0	1	€ 12.000	€ 24.000
Portable FM Radios		per radio	€ 1.000	5	€ 5.000	5	€ 5.000	5	€ 5.000	€ 15.000
Maintenance Tools & Equipment		lump sum	€ 15.000	1	€ 15.000	0	€ 0	0	€ 0	€ 15.000
Office Equipment for Base Lodge		lump sum	€ 20.000	1	€ 20.000	0	€ 0	0	€ 0	€ 20.000
Lift Operations Tools		lump sum	€ 10.000	0,4	€ 4.000	0	€ 4.000	0	€ 2.000	€ 10.000
Ski Patrol Equipment		lump sum	€ 40.000	0,38	€ 15.000	0	€ 5.000	1	€ 20.000	€ 40.000
Ticket System		lump sum	€ 50.000	1	€ 50.000	0	€ 0	0	€ 0	€ 50.000
On-Mountain Telephone System		lump sum	€ 50.000	0,4	€ 20.000	0	€ 10.000	0	€ 20.000	€ 50.000
Rental Ski and Snowboard Sets		sets	€ 600	300	€ 180.000	300	€ 180.000	400	€ 240.000	€ 600.000
Rental Snowshoeing Sets		sets	€ 100	20	€ 2.000	0	€ 0	0	€ 0	€ 2.000
Rental Nordic Skiing Sets		sets	€ 400	20	€ 8.000	0	€ 0	0	€ 0	€ 8.000
Rental Mountain Biking Sets		sets	€ 1.000	10	€ 10.000	5	€ 5.000	5	€ 5.000	€ 20.000
Ski Area Signage		lump sum	€ 50.000	0,4	€ 20.000	0	€ 10.000	0	€ 20.000	€ 50.000
Tubes Park Equipment & Const.		lump sum	€ 35.000	1	€ 35.000	0	€ 0	0	€ 0	€ 35.000
Euro Bungee Trampoline		lump sum	€ 30.000	1	€ 30.000	0	€ 0	0	€ 0	€ 30.000
Climbing Wall		lump sum	€ 40.000	1	€ 40.000	0	€ 0	0	€ 0	€ 40.000
ZipRider Zip Line		lump sum	€ 400.000	0	€ 0	1	€ 400.000	1	€ 400.000	€ 800.000
Mountain Cinema		lump sum	€ 10.000	1	€ 10.000	0	€ 0	0	€ 0	€ 10.000
Misc. Equipment		Acct. 07		20%	€ 203.400	20%	€ 95.600	20%	€ 139.600	€ 438.600
VEHICLES & EQUIPMENT TOTAL					**€ 1.300.400**		**€ 973.600**		**€ 1.237.600**	**€ 3.511.600**

Miscellaneous Operating - #08

This category includes construction management fees which after consultation with MEPSO have been reduced to two percent of Accounts 02 through 07. Permits for building, electrical, water, sewer, etc., are estimated to be one percent of Accounts 02 and 06 which has been confirmed to be correct by MEPSO without costs for use and acquisition of land.

Financing Costs - #09

Normally, during the construction period, short term construction financing is used. Once the project is completed, long term financing is put in place. For the purposes of this order of magnitude capital budget, we have included short term construction financing for the first 12 months of construction at a weighted average rate of 7 percent, following input from MEGA KL and consultation with Horwath HTL. Most of the line items listed in Account 07 are not delivered until the ski area is ready to operate, and as such are not included.

Legal Fees - #10

Legal fees for the preparation of tendering, contracts, etc., are normally included in the capital budget. For the purposes of this order of magnitude capital budget, we have included a cost for legal fees at 1 percent of the cost of Accounts #01 through #08 which has been confirmed by MEPSO.

Contingency

All projects of this magnitude include contingencies to cover the costs of any unforeseen conditions. Since most of the total account budgets do not allow for contingencies, we have re-calculated this item now substantially reduced to 5 percent following input from MEGA KL and confirmation by MEPSO. We need to point out that the previously used 15 percent would appear more adequate as an overall goal due to the conceptual nature of the design without detailed engineering. Table IX.8 lists the miscellaneous operating costs, construction financing costs and contingency for the concept.

TABLE IX.8
GALIČICA
MISCELLANEOUS, CONSTRUCTION FINANCING, LEGAL AND CONTINGENCY COSTS

Account	#	Units	Unit Price	Qty	Phase 1	Qty	Phase 2	Qty	Build-out	Total
MISC. OPERATING	**8**									
Construction Management		Acct. 02 - 07		2%	€ 413.000	2%	€ 112.000	2%	€ 226.000	€ 751.000
Permits		Acct. 02 & 06		1%	€ 193.000	1%	€ 46.000	1%	€ 100.000	€ 339.000
MISC. OPERATING TOTAL					**€ 606.000**		**€ 158.000**		**€ 326.000**	**€ 1.090.000**
FINANCING COSTS	**9**									
Short Term Construction Financing		**Acct. 1-6 & 8**		**7%**	**€ 1.436.000**	**7%**	**€ 336.000**	**7%**	**€ 727.000**	**€ 2.499.000**
LEGAL FEES	**10**									
Misc. Legal Fees w/o land acquisition		**Acct. 1-8**		**1%**	**€ 218.000**	**1%**	**€ 58.000**	**1%**	**€ 116.000**	**€ 392.000**
SKI AREA PROJECT SUBTOTAL		**All Accounts**			**€ 23.468.500**		**€ 6.167.100**		**€ 12.470.500**	**€ 42.106.100**
CONTINGENCY		**Project Subtot**		**5%**	**€ 1.173.000**	**5%**	**€ 308.000**	**5%**	**€ 624.000**	**€ 2.105.000**
SKI AREA PROJECT TOTAL (2013 EUROS)					**€ 24.641.500**		**€ 6.475.100**		**€ 13.094.500**	**€ 44.211.100**
CUMULATIVE TOTAL					**€ 24.641.500**		**€ 31.116.600**		**€ 44.211.100**	

.2 Summary

For the completed Master Plan project and based on the inputs received from MEPSO and MEGA KL, we estimate that the Galičica Concept Plan will cost €23,5 million in Phase 1, €31,1 million by the end of Phase 2 and a total of €44,2 million at build-out. Table IX.9 summarizes the revised Order Of Magnitude capital costs for the proposed development concept as drafted during the Master Plan.

TABLE IX.9
GALIČICA
ORDER OF MAGNITUDE CAPITAL COST SUMMARY

Account	#	Phase 1	Phase 2	Build-out	Total
PRE-DEVELOPMENT TOTAL	01	€ 568.200	€ 16.300	€ 15.800	€ 600.300
BUILDINGS TOTAL	02	€ 2.037.400	€ 845.000	€ 512.500	€ 3.394.900
SKI LIFTS TOTAL	03	€ 12.190.800	€ 2.906.700	€ 3.393.300	€ 18.490.800
SKI PISTE TOTAL	04	€ 390.800	€ 541.300	€ 5.388.700	€ 6.320.800
PARKING, ROADS TOTAL	05	€ 1.625.900	€ 177.200	€ 448.600	€ 2.251.700
UTILITIES TOTAL	06	€ 3.095.000	€ 155.000	€ 305.000	€ 3.555.000
VEHICLES & EQUIPMENT TOTAL	07	€ 1.300.400	€ 1.045.600	€ 1.165.600	€ 3.511.600
MISC. OPERATING TOTAL	08	€ 606.000	€ 159.000	€ 325.000	€ 1.090.000
FINANCING COSTS	09	€ 1.436.000	€ 336.000	€ 727.000	€ 2.499.000
LEGAL FEES	10	€ 218.000	€ 58.000	€ 116.000	€ 392.000
Subtotal		**€ 23.468.500**	**€ 6.240.100**	**€ 12.397.500**	**€ 42.106.100**
Contingency	5%	€ 1.173.000	€ 312.000	€ 620.000	€ 2.105.000
Concept Plan Project Total		**€ 24.641.500**	**€ 6.552.100**	**€ 13.017.500**	**€ 44.211.100**
CUMULATIVE TOTAL		**€ 24.641.500**	**€ 31.193.600**	**€ 44.211.100**	
SCC		880	1.990	3.000	
Cost/SCC		€ 28.002	€ 15.675	€ 14.737	

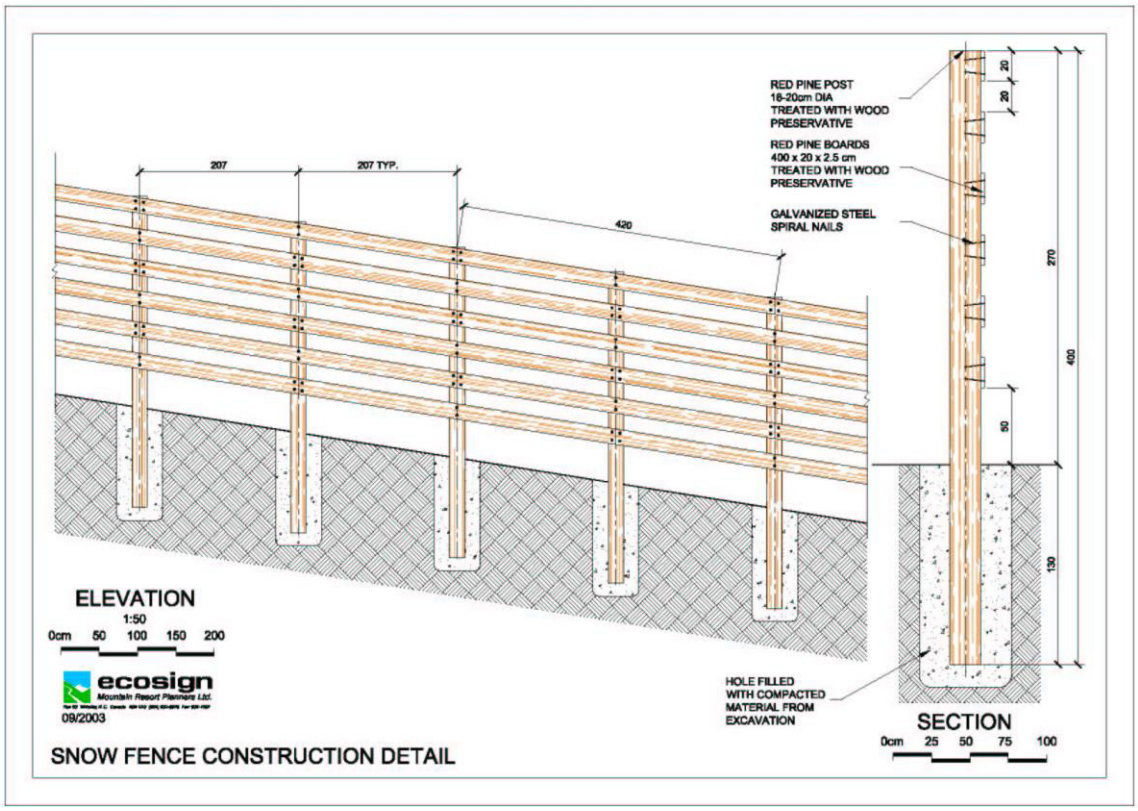
Based on a Skier Carrying Capacity (SCC) of 880 skiers per day for the proposed Phase 1 development concept, the capital budget results in a cost of €28.002 per unit of carrying capacity, exclusive of value added taxes. After the completion of the Phase 2 development concept with a skier carrying capacity of 1.990 skiers, the cost per unit of skier carrying capacity is €15.675. At build-out, the 3.000 skier capacity results in a capital cost capacity ratio of €14.737 per skier.

APPENDIX A

Snow Fencing

We are proposing to utilize a system of wooden snow fencing to catch wind-transported snow, which can then be groomed by the piste machines. We are proposing a system of having the "primary" pistes open on a reliable basis by using a wooden snow fencing system to collect and retain snow. The alpine area of the Galičica National Park is susceptible to high speed wind and in combination with snow storms this results in large amounts of snow being transported by wind. The wind scouring causes difficulty in opening and maintaining pistes.

Ecosign has been involved for many years with installing snow fencing systems to trap natural snow and place it on the desired piste. We have provided the following diagram of construction detail of a typical snow fence system, as illustrated below.



Snow Fence Construction Drawing

Generally, we recommend purpose built wooden fences which are between 50 cm and 1 meter above the ground to keep the snow from plugging up the fence and having a height of between 1,5 and 2 meters of snow fence. The snow fences are made of natural wood treated with wood preservative, with 50 percent of the space in wood and 50 percent air. This creates a baffle in the laminar wind flows and creates turbulence on the leeward side of the fence. By adjusting the height of the fence above the ground and the overall height of the wooden part of the fence, one can control the depth and width of the snow pillow which is deposited on the leeward side. This type of snow fencing has been installed at Sierra Nevada, Spain, Zermatt, Switzerland and Valle Nevado, Chile.

We have provided four photos of the snow pillows created by snow fencing on the pistes at the Sierra Nevada ski resort in Spain which has constructed over 26 kilometers of snow fencing. The snow fencing costs approximately one-fifteenth of the cost of snowmaking systems and of course, there is no annual energy, operation and maintenance costs.

Photo of snow pillow created by snow fence on the windward side of piste below chairlift at Sierra Nevada, Spain

Photo of snow fencing and snow deposition on pistes at Sierra Nevada, Spain

Plastic "Lexan" snow fence on skiway at Sierra Nevada, Spain

Snow fencing and snow deposition leeward on pistes at Sierra Nevada, Spain

View of Snow fencing