
Sustainable **Whitewater** Sport Centres

December 2014

Ramon Ganyet, Carl De Smedt
ICF Strategy Commission



canoeicf.com

The document is addressed to:

International Olympic Committee (IOC) and National Federations

Main issue is the value of bringing whitewater to large populations/cities, proof that the sport is a superb asset to the Olympic movement and that the five days of competition is just the start of a lifetime of action.

Local Authorities

Investing in a whitewater venue that meets with International Canoe Federation (ICF) competition guidelines delivers the opportunity to attract world-class competition, deliver new revenue streams from additional whitewater activities, become an international training centre, provide a return on investment, and boost tourism. The ICF and the National Federation are there to support and provide guidance every step of the way.

Leaseholders and Trusts

Running a whitewater centre is an attractive proposition, hosting world-class events is a great way to increase the profile of the venue, it's possible to balance profit through rafting etc., and allow elite level training at the same venue. Again the ICF and the National Federation are there to support and provide guidance every step of the way.

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Foreword

The canoe slalom discipline requires a whitewater course for the Olympic competition. The International Canoe Federation (ICF) encourages the construction of whitewater venues for the development of different canoeing activities associated with the present and future sport.

This document, developed by the International Canoe Federation's Olympic Strategy Commission, aims to capture the essence of what makes a successful whitewater venue and contains recommendations and guidelines to assist future venue construction.

A facility that is built for the sport of canoeing should primarily be used by the sport. But whitewater venues should also be economically sustainable, offering commercial activities that generate the additional income that is necessary to achieve break even financial results. This document contains case studies of six of the most prominent artificial canoe slalom venues across the globe, and assesses their sustainability, economic impact and legacy. It then focuses on the key commonalities between the venues, pulling out the critical success factors that provide a solid basis for future venue specification, construction and delivery.

However, there are key factors that should be attended to in order to succeed in justifying the capital investment cost and provide an economically sustainable venue. This document presents findings from our venue survey and offers guidelines for developers.

The canoeing whitewater venues bring social benefits, promoting sport for all and providing economic multiplier effects on the region. Let's plan and manage them in the most appropriate manner. The ICF is ready to support the developers for the benefit of the sport.

This first document on whitewater venues is an initial investigation to prepare an ICF International Observation on Whitewater Centres, to collect data and provide available information to the existing venues around the world.

Always moving forward.

JEAN-MICHEL PRONO

ICF Chairman of Canoe Slalom

THOMAS KONIETZKO

ICF Strategy Commission

Whitewater Sport Centres

Canoeing has a tradition of thousands of years of navigation in order to move and fish on rivers and sea. The popularity of the sport began with John MacGregor's publication, "A thousand miles in the Rob Roy canoe" in 1865. At the turn of the nineteenth century many canoe clubs were founded in central Europe and North America. The rivers and lakes became the natural sites to develop the activities.

Whitewater paddling had a great expansion in the mid-twentieth century because of the construction of boats with new materials such as fiberglass and, a few years later, polyethylene plastic boats. In the late 1960's canals were, diverted from the rivers, dedicated to the canoe slalom discipline in whitewater. The first great success was in Augsburg, Germany, for the 1972 Munich Olympic Games, where a 600m canal introduced the slalom competition as an exhibition sport and had a great impact on the development of canoe slalom racing. This Eiskanal is still in active operation, more than 40 years later. With a similar principle of creating an artificial whitewater course connected to a river flow, nowadays there are more than 30 successful facilities in the world.

The first recirculating water course was created in La Seu d'Urgell, Spain, for the 1992 Barcelona Olympic Games, allowing canoe slalom to join the Olympic programme, where it remains today. Since that experience a dozen closing circle whitewater centres have been created, combining canoe sport and whitewater recreation activities.

Today, the centuries old tradition of whitewater paddling in rivers is rejuvenated in hundreds of places over the world, and is still the best option to develop the sport in places that have the appropriate water conditions: regular river flow and appropriate gradient (e.g. Prague in Czech Republic, Tacen in Slovenia and Cunovo in Slovakia).

Nevertheless, in flat lands or to introduce the sport in urban areas and metropolitan cities, in the last 20 years venues that combine sport and recreation to produce a permanent facility specialising in whitewater artificial venues by pumping water to the top of a small gradient to create wildwater features.

The ICF encourages the construction of whitewater venues for different canoeing activities to ensure the future of whitewater sports. There are many examples of sustainable and economically viable venues across the globe; this study highlights the critical success factors to assist and support future venue construction and planning. The study will investigate whether such an investment for the Olympic Games or for sports development can ensure long-term benefits for the region and establish which requirements will be necessary to ensure such benefits.

The whitewater centres financed for Olympic Games competition can provide the owner/operator a positive, sustainable facility for the local community incorporating several activities post-Olympic Games.

Development over 50 years of whitewater centres

1972

AUGSBURG
(GERMANY)

- Dam water drop on River Lech for Eiskanal: Diversion of water to river

1992

LA SEU D'URGELL
(SPAIN)

- Canoe slalom in Olympic programme
- First closing circle concept, boat lift
- Electricity production

1999

PENRITH
(AUSTRALIA)

- Stadium concept



1986

NOTTINGHAM
(GREAT BRITAIN)

- Canoe slalom together with canoe sprint
- Dam drop on River Trent

1993

LANNION
(FRANCE)

- Energy from tide
- Movable obstacles to produce whitewater

2004

HELLINIKON,
ATHENS (GREECE)

- Theatre concept
- Sea water

2006

US NWC
CHARLOTTE (USA)

- Second beginners and training course
- Global nature sport park



2009

PAU
(FRANCE)

- River Gave water diversion
- Combination of river feed and pump water



2012

AL AIN
(ABU DHABI)

- Multisports centre
- Whitewater courses in 3 loops



2007

SHUNYI, BEIJING
(CHINA)

- Training course with a single pump house

2011

LEE VALLEY PARK,
LONDON
(GREAT BRITAIN)

- Water treatment plant
- Segregated training course

2013

VIENNA
(AUSTRIA)

- Compact design in Danube riverside park

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**LA SEU
D'URGELL,
CATALONIA,
SPAIN**

**PENRITH,
NEW SOUTH
WALES,
AUSTRALIA**

**CHARLOTTE,
NORTH
CAROLINA,
UNITED
STATES**

**OF AMERICA
MARKKLEEBERG,
SAXONY,
GERMANY**

**LEE VALLEY
PARK,
LONDON,
GREAT
BRITAIN**

**VIENNA
WATERSPORTS
ARENA,
VIENNA,
AUSTRIA**



1.0



A survey of existing consolidated centres

A survey of existing consolidated centres

For the study six venues have been selected, that, in addition to canoe sport, offer commercial recreation activities, have hosted an ICF slalom competition and have a pumping water system.

PARC OLÍMPIC DEL SEGRE

La Seu d'Urgell, Catalonia, Spain, 1992 Barcelona Olympic Games

PENRITH WHITE WATER STADIUM

Penrith, New South Wales, Australia, 2000 Sydney Olympic Games

U.S. NATIONAL WHITEWATER CENTER

Charlotte, North Carolina, United States of America

KANU PARK MARKKLEEBERG

Markkleeberg, Saxony, Germany, 2012 Leipzig Olympic Games Bid

LEE VALLEY WHITE WATER CENTRE

Lee Valley Park, London, Great Britain, 2012 London Olympic Games

VIENNA WATERSPORTS ARENA

Vienna, Austria

The Olympic venue of Athens (2004) is used exclusively for canoe slalom World Cup events. A management concession has recently been implemented. The Olympic venue of Shunyi, Beijing (2008) is not commercially operated.

Each project has a particular environment. The selected city/region has different external inputs and specific environmental and social context. The population resident in the area, average income, tourist visitors/tourist attractions, and political and sport organisation are varied for each project.

All selected whitewater centres share canoe sport and commercial recreation activities. The six centres are economically sustainable. Whitewater canoeing is incorporated into a public parks encouraging outdoor activities to the general public and local communities.

Overview

| | LA SEU D'URGELL | PENRITH | CHARLOTTE |
|---------------------------|--|---|---|
| | Spain Year 1991 Olympic Games: Barcelona 1992 Water supply: River Segre Regular flow: 7 m ³ /s rafting 10 m ³ /s canoeing Construction time: 20 months Operation years: 22 | Australia Year 1999 Olympic Games: Sydney 2000 Water supply: Lake (quarry) Regular flow: 14 m ³ /s Construction time: 21 months Operation years: 15 | United States Year 2006 Water supply: Ground Regular flow: 12 m ³ /s rafting 23 m ³ /s canoeing Construction time: 18 months Operation years: 7 |
| CITY POPULATION | 12,500 | 190,000 | 700,000 |
| VISITORS | 375,000 | 108,000 | 750,000 |
| WHITewater USERS | 50,000 | 70,000 | 145,000 raft 12,000 kayak |
| SIZE (SQUARE METRES) | 66,000 | 100,000 | 1,619,000 |
| PUMP ELECTRICITY POWER | 1,600 kVA | 1,600 kVA | 3,500 kVA |
| CONSTRUCTION COST (€) | 6,280,000 | 4,333,000 | 16,154,000 (13,077,000)* |
| EQUIPMENT COST (€) | 175,000 | 167,000 | 935,000 |
| ADDITIONAL INVESTMENT (€) | 2,600,000 | 200,000 | 2,300,000 |
| EXPENSES 2013 (€) | 988,000 | 1,227,000 | 10,122,000 |

* Associated infrastructures

| MARKKLEEBERG | LEE VALLEY | VIENNA |
|--|---------------------------------------|---------------------------------------|
| Germany | Great Britain | Austria |
| Year 2006 | Year 2011 | Year 2013 |
| | Olympic Games: London 2012 | |
| Water supply: Lake (old mine) | Water supply: Ground | Water supply: River |
| Regular flow: 10 m ³ /s rafting 14 m ³ /s canoeing | Regular flow: 13 m ³ /s | Regular flow: 12 m ³ /s |
| Construction time: 14 months | Construction time: 12 months | Construction time: 18 months |
| Operation years: 7 | Operation years: 3 | Operation years: 1 |
| 20,000 | 12 million | 1 million |
| 350,000 | 150,000 | 1,800 |
| 22,000 | 51,000 | 1,000 |
| 50,000 | 106,900 | 30,000 |
| 2,500 kVA | 4x1,000 kVA | 1,400 kVA |
| 11,900,000 | 39,370,000 | 5,000,000 |
| 600,000 | 486,000 | (500,000) |
| 600,000 | 0 | 50,000 |
| 1,100,000 | 2,776,000 | Incomplete year |

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PARC OLÍMPIC DEL SEGRE

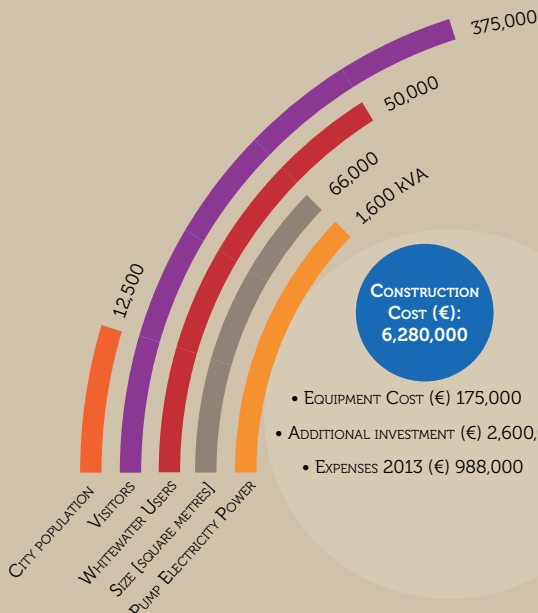
BARCELONA 1992 www.parc olimpico.cat

Canoeing has fifty years of experience in the Pyrenees mountain range. The recovery from a River Segre flood in 1982 and the project for the 1992 Barcelona Olympic Games Canoe Slalom venue, promoted by the municipality, consolidated an urban renewal in the historic city of La Seu d'Urgell.

- The urban park is next to the old historic town. The whitewater courses are connected to the river by a flat-water canal, which also feeds a reversible turbine-pumping power station. Conveyor belts lift boats and paddlers for the first time in canoe whitewater venues.
- The organisation of canoe slalom competitions is frequent. The facility hosts a local canoe club for development of slalom and a high performance centre. There is a consistent school programme to attract children to the canoe sports.
- Management of the park is carried out by a public company belonging to the municipality. The employment directly generates 27 equivalent jobs. After 22 years of operation the surplus has allowed the centre to repay a loan of 20 per cent of investment cost (1.1 million €) and reinvest 2.6 million € in the venue.



> FRANCESC GANYET



COUNTRY: SPAIN

OPENING YEAR: 1991

WATER SUPPLY: RIVER SEGRE

REGULAR FLOW:

7 M³/S RAFTING - 10 M³/S CANOEING

CONSTRUCTION TIME: 20 MONTHS

OPERATION YEARS: 22

1.3



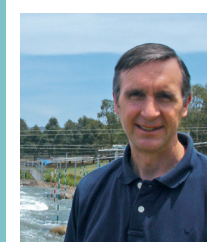


PENRITH WHITewater STADIUM

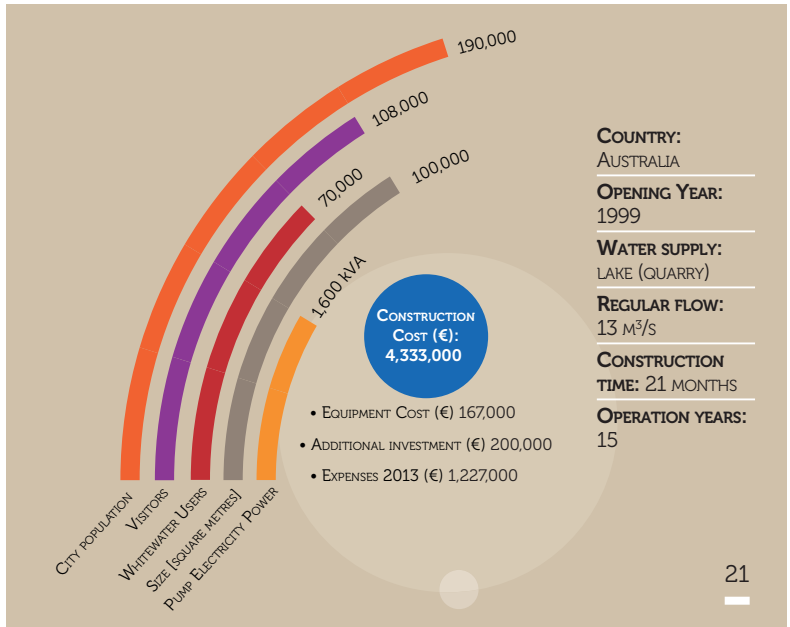
SYDNEY 2000 www.penrithwhitewater.com

In 1998 the active participation of Penrith City Council facilitated the permanence of canoe slalom in the Olympic programme. The course, designed as a stadium, is in the same Olympic area as the canoeing and rowing racing centre. The low investment cost is a consequence of the pragmatism that inspired its design and operation. Penrith's design layout has been taken as a model for the next generation of closing-circle whitewater courses.

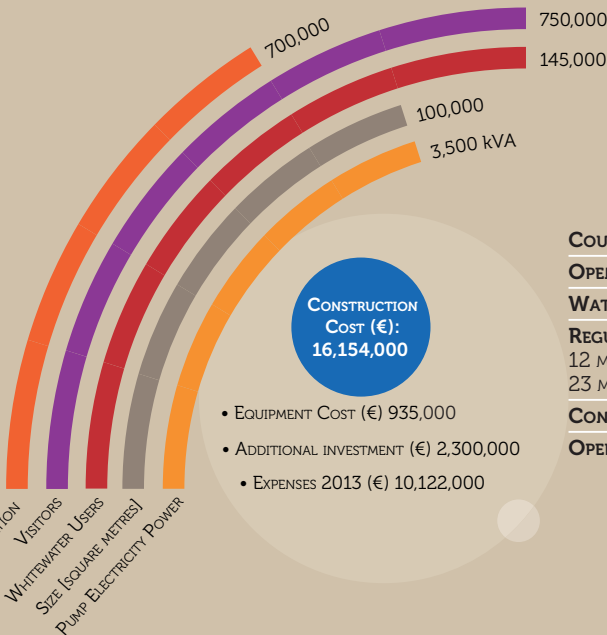
- Canoeing and commercial recreation are distributed according to an agreement that fixes the time of each activity. Rescue training and education is a significant and regular activity.
- Smart business has permitted the centre to pay back the 25 per cent investment cost (1 million €) provided by the city council.
- Up to now this is the only man-made whitewater course of its kind in the Southern Hemisphere.



> JACK HODGE



1.4



- EQUIPMENT COST (€) 935,000
- ADDITIONAL INVESTMENT (€) 2,300,000
- EXPENSES 2013 (€) 10,122,000

COUNTRY: U.S.A.

OPENING YEAR: 2006

WATER SUPPLY: GROUND

REGULAR FLOW:
12 M³/S RAFTING
23 M³/S CANOEING

CONSTRUCTION TIME: 18 MONTHS

OPERATION YEARS: 7

CHARLOTTE U.S. NATIONAL WHITEWATER CENTER

www.usnwc.org

A small group of motivated and enthusiastic people started the project in 2006. Originally the idea was inspired and based on the Penrith, Australia, model but was amended into a more complete “outdoor recreation” model when the local county land presented itself to the organising group. The County of Mecklenburg leased land of 400 acres to the non-profit outdoor recreation company (USNWC) which constructed the facility and operates the venue. The two whitewater courses (1,140 m) were built to accommodate a large recreational population as well as meet the needs of training athletes. The USNWC is an official Olympic Training Centre for whitewater slalom racing and has an agreement with the US Olympic Committee as it relates to providing training at the facility.

- In addition to whitewater commercial recreation activities and slalom training, there are many land activities offered, such as: mountain biking, rock climbing, aerial sports (zip lines and above ground elements), flatwater kayaking and Stand Up Paddling (SUP), and others. Beginning in 2009 the facility amended its model to operate more like an amusement park by selling a day pass to access all activities for one price. There is also an annual pass option that is very popular for local residents. Organising 50 concerts per year, several large running, biking, and paddling events per year, providing good healthy food and beer, fireworks, and educational programmes have brought many users to the park. Marketing is a relevant expense. The peak season goes from May to September, while from December, January and February the whitewater channel system is turned off. The USNWC is open 363 days a year. The population of Charlotte is 700,000 residents. The population within 100 miles of Charlotte is an estimated 7 million.
- Liability is covered by insurance. All activity participants must sign a document assuming responsibility.
- The initial investment cost in 2006 was \$38 million (29 million €). In 2009 a debt restructuring resulted in \$23 million of the debt being cancelled. By 2014 the remaining debt had been paid, and the facility now has an estimated annual cash flow of \$3 million which has been sufficient for a quick amortization. Nowadays the surplus is dedicated to the new investments going back into the business, because it is a non-profit company. The full park (99%) is commercially oriented. Some 6 or 7 national canoe teams and development canoeing for kids have some 700 hours per year on the courses. Normally, canoes and rafts share the whitewater courses and they run for an estimated 2,500 hours annually. Only during competitions and national team training sessions are the other sports and activities excluded.



> DAVID HEPP

1.5



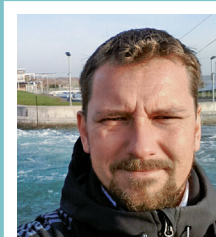


KANUPARK MARKKLEEBERG

www.kanupark-markkleeberg.com

Leipzig has a very deep tradition of canoe slalom competition, winning medals since the 1972 Munich Olympic Games. The project was in 2002 included on a bid for the 2012 Olympic Games in Leipzig. Later in 2005 the city of Markkleeberg joined together with the federal sport administration for construction of the venue on the lakeside of Markkleeberg (250 ha in a former open coal mine, 1999). Financing was shared; 80 per cent by the Federal Government and 20 per cent by the municipality. And the initial share of use for athletes canoeing (80%) and commercial rafting (20%) was the same as the investment financing. But activities could not cover expenses and the share has been changed to 60% canoeing (600 hours per year) and 40% commercial (400 hours per year). To balance the economy the share will change to 50:50.

- The training course (130 m long, with smaller pumps) is hardly used for 50 hours per year. It looks to be unsafe for swimming.
- There is room to improve canoeing programmes and competitions for using more paddlers at the same time in the whitewater course.

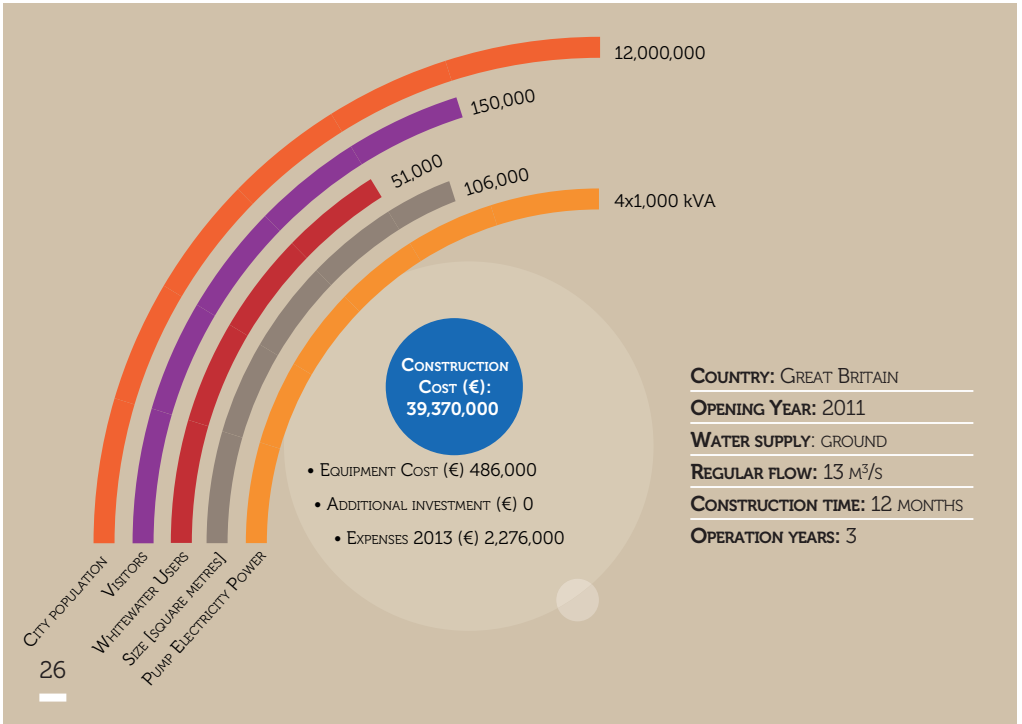


> CHRISTOPH KIRSTEN





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LEE VALLEY WHITE WATER CENTRE

LONDON 2012 | www.leevalleypark.org

Lee Valley Regional Park Authority in metropolitan London, worked closely with the London Organising Committee of the 2012 Olympic Games (LOCOG) in the construction of the Olympic canoe slalom venue in the borough of Broxbourne. The park now operates the venue and from 2015 the centre will be operated as a Not-For-Profit Trust, which will benefit from an 80% business rate reduction which will further secure the centre's financial stability.

- The original investment cost was 31 million GBP (39 million €) to become the best Olympic canoe slalom venue in the world. The construction was accomplished in 12 months because of the accuracy in the executive project and length of prior preparation. The centre opened pre-Games in 2011 with commercial whitewater operations, having an immediate success attracting large numbers of visitors and income.

- Olympic canoe slalom in London 2012 achieved a huge worldwide audience on TV and online.

- The iconic image of Olympic canoe slalom is of strong value to any whitewater venue.

- In 2013 additional building works were commissioned to increase the size of the building by adding further changing rooms, increasing the size of the café area, creating offices and training areas for the GB National Slalom Team.

In addition to the works within the building, additional legacy works included external landscaping to improve spectator provision around the Olympic course and additional car parking spaces.

- In spite of expenses of 2,776,000 € in the fiscal year 2013-14 the forecast is, with similar expenses, a break even result for present fiscal year 2014-15 (beginning on April 1st).

- A local agreement is in place with the British Canoe Union, which allows for water usage at reduced cost when compared to the usual commercial rates (This is subject to a minimum amount of spend per year). Regular competitions are held during each year, which include the GB Team selections, and Regional/National Slalom competitions.

The canoe slalom World Championships are scheduled for September 2015.

- The legacy course, with reduced drop and flow, is used for development programmes in paddle sport and local canoe club development for local residents and schools. Fire and Rescue teams use this course most days during the week between 9.00 am and 4.00 pm.

- The closed system of water used to service the whitewater courses requires constant treatment to maintain good water quality. This is achieved by filtering the water constantly and treating the water with chemicals and UV. This maintains the water to meet the European bathing water quality standards. This treatment allows the centre to offer open water swimming as an additional activity. The water treatment maintained cost is 150,000 € per year.

- The long tradition of paddling in Great Britain (150 years) was a key factor of the exploding success of the Lee Valley White Water course.



> SIMON RICKETT



VIENNA WATERSPORTS ARENA

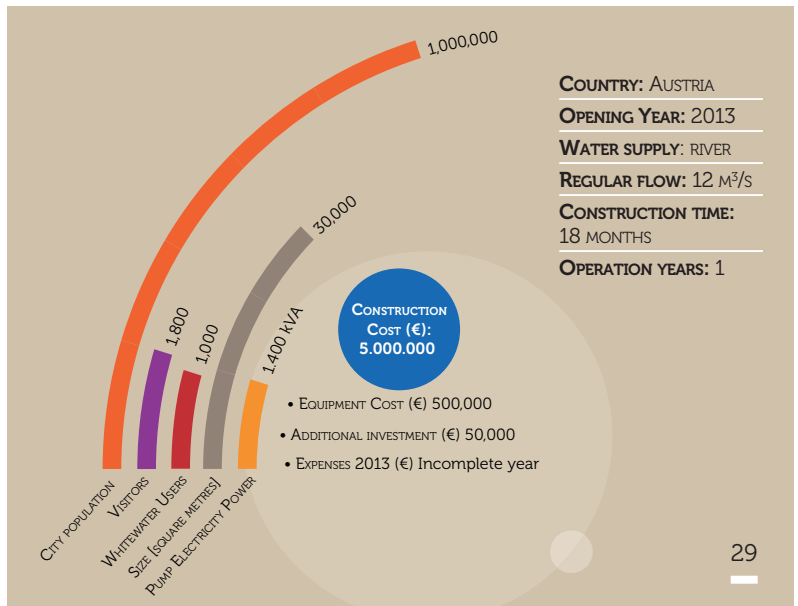
www.viennawatersportsarena.at

To prevent floods in the city of Vienna, the government of Austria has constructed a big alternative canal alongside the Danube (New Danube) creating an island in between, dedicated to an environmental park (no cars). Promoted by the Austrian Canoe Federation and Sport Ministry a very compact whitewater venue has been constructed.

- It is 300 m from the completely renovated National Rowing Centre located in the Danube riverside, and because of distance, some facilities such as toilets, changing rooms and showers are impractical to share. There are some plans to provide these services in a new building located in the vicinity, improving the circulation of customers.
- Car parking is off the island, at 500 m walking distance.
- The park is operated by Vienna City Wildwasser Institute.
- The management is shared between the National Canoe Team (Austrian Canoe Federation) and commercial whitewater recreation (a concession). Up to now there is no collaboration and each operator has exclusive use part-time.
- The ICF Wildwater Sprint World Championships are scheduled for 2015.



> ROBERT SOMMER



2.0

Guidelines for new whitewater centres

The initiation and promotion of a whitewater venue has usually come from a small number of persons associated with a public institution (municipality, sport government, canoe federation).

In relevant cases the centre has been associated with the Olympic Games. The location of a new facility should take into consideration the water supply and population catchment area. The vicinity of a city would facilitate good transport for potential users.

In October 2014, following a survey on the six significant precedent centres, a workshop was conducted in Frankfurt with their managers. From their experience, these guidelines and recommendations have been compiled, to help a closer understanding of a whitewater canoe centre.

2.1

A MASTER PLAN CAN PREPARE THE APPROPRIATE DESIGN FOR THAT PARTICULAR SITE.

According to experiences it will be necessary to provide:

- Land, with surface in between 30,000 m² to 100,000 m² ;
- Proper environment;
- Investment capital, in between 5 M€ (6,5 million USD) to 20 M€ (25 million USD);
- A flow of whitewater, in between 8 m³/s and 14 m³/s.

If not affordably diverted from the river, it will need a pumping system:

- In a pump version that will need electricity power, in between 2,000 kVA and 4,000 kVA;
- Water of bathing quality: National regulations, EU regulations, USA regulations.

2.2

A CONCEPT DESIGN, TO ESTABLISH THE OVERLAY THAT FITS THE SITE:

The Concept Design should consider all basic elements,

- Access, especially for vehicles,
- Parking area,
- Feeding water or water reservoir pond, depending on water supply,
- Whitewater course(s) layout,
- Facility building(s), with the programme of architecture,
- Technical building(s), for electricity and water treatment plant.

The circulation of users and staff should be carefully examined.

The accessibility of vehicles for maintenance and operation should be considered. The water circulation will be defining the circulation of the users of water. The levels of the courses have no flexibility, and all other circulation paths should be accommodated in cross passages (normally bridges). At least one pass along the course is necessary, one or two pedestrian bridges should cross through the course.

The whitewater course:

- The length should be between 250 m and 500 m;
- The average gradient should be between 1 and 2 per cent;
- The water drop, according to the length and gradient, between 3.75 m and 7 m;
- Movable obstacles in order to permit changes to be made to the whitewater configuration and allow for renovation/rejuvenation.

Features:

- A practical support for slalom gates, helping their use in training sessions.

For Olympic venues, ICF provide the competition requirements

In addition to a competition course an intermediate course is very useful for sport development and rescue teams training.

The pump house:

Submergible pumps prevent environment noise, but can transmit vibration to the building. Normally there is a group of standard units to deliver different flows.

Archimedean screw pumps could be an option for a low drop to pump as utilised at the Tees Barrage International White Water Rafting course in the UK.

2.3

VENUE SUPPORT FOR CANOEING

A primary issue should be the actions to support paddle sports, mainly Slalom and Freestyle. To make money through the sport is very difficult, and should not be the priority for the ICF and national federations.

Areas of consideration for the venue operation:

- High Performance in the sport,
- Training facility,
- Competition venue,
- Canoeing development,
- Encourage sport for all.

The social benefit of the sport has to be taken in consideration.

The previous preliminary agreement to prioritise sport in the whitewater centre management is very important to secure the sport legacy entrusted to the centre.

2.4

IN ADDITION TO CANOE SPORT, THE VENUE SHOULD BE COMMERCIALY ORIENTED:

- Activities related to sport: athletes training, regional and international competitions, paddling development;
- Activities related to recreation in water: rafting, flatwater canoeing, open kayak, inflatable kayak and river boarding;
- Activities related to land: biking, hiking, climbing, canopy, zip cabling;
- Other activities.

Food and drinks: in addition to activities in sport and recreation, a centre should provide services such as restaurant, cafe, vending machines. These services can increase the income of the centre by as much as 15 to 20 per cent.

Most of the centres have a shop to sell equipment or sports equipment, tee shirts, merchandising, food and drinks.

Normally the whitewater parks are enclosed with a fence, to have some control.

2.5

THE PROJECT

The project should be designed to accommodate the selected activities in good balance, according to the capacity of users in each activity. Large scale events that attract large audiences and local interest should be contemplated.

It is recommended to incorporate the management staff in the design team, to produce a sustainable venue.

In Olympic Games venues, the priority in design should be towards the legacy operation, and then to accommodate the Olympic requirements for a two weeks' exceptional competition.

2.6

EMPLOYMENT

The participation of operational management staff during design, project and construction is recommended. At least one management person should be employed at the first stages of the construction. Normally due to seasonal climate changes and labour vacation periods, whitewater venues have seasonal attendance. Some venues close in wintertime. Most of them have big peaks of attendance at vacation time. Consequently the staff is composed of a few permanent employees (from 5 to 45) and temporary employees (from 40 to 800). Jobs directly generated are increased by indirect business (because of the side economy) and jobs induced by the multiplier economy.

3.0

Management of economically sustainable centres

Carl De Smedt

When the construction is finished, the whitewater venues in the study have been operated in a mixed compromise between sport and commercially oriented activities. Staff wages account for 50 per cent of total expenses, electricity can be 20 per cent and maintenance results in some additional expenses. Rafting and other commercial activities have provided the income necessary to pay the expenses, and also in some cases to return a share of initial capital investment. All centres have started the operation with an additional capital investment in equipment for the activities; and the older centres have generated capital to improve the centre with additional investment. All centres have a seasonal operation, with a lower activity in winter/cold season.

The management has been organised in different ways in each centre, according to specific administration and regulations. There are 5 administrations through a public company, and a single commercial concession as management of the centre in Vienna. The compromise between sport and recreation was initially settled by an agreement between the sport (federation, sport council) and the owner of the centre.

3.1 Key factors for sustainability

The Frankfurt workshop has collected the expert managers' advice»

- Select the best place affordable,
- A good project, dedicated to sport but also commercially orientated,
- Prepared for the day after the Olympic Games,
- Operation management should work together with the design team,
- Realistic project budget,
- A good degree of cooperation between partners: sport, public agencies, communities, venue management,
- A good financial plan, including investment cost and equipment cost,
- A business plan adapted to environment changes,
- A good manager, enthusiastic and motivated staff,
- Development programmes, well-structured to attract kids,
- Development of easy water (grade 1), for younger kids and schools,
- Appropriate water level, according to users,
- Quality of water, conforming to open water bathing standards
- Care with consumers' secondary spend which can then provide additional revenue.
- Offer the best quality, creating a sense of unique experience in the outdoors.

3.2 Business plan

Taking as a reference the more than 20 years of experience in managing the Parc Olímpic del Segre in la Seu d'Urgell (Spain), we have developed a showcase for a generic whitewater centre.

The final conclusion is that, under reasonable assumptions of objective criteria with respect to number of visitors, location, capacity, pricing and various other factors, which we will explore in more detail, a whitewater centre can be sustainable and profitable, as well as a cash-generating business.

Due to major variations from site to site in areas as varied as location, population, climate, acquisition power and others, the model we have developed is based on the minimum conditions required to have a viable operation that breaks even on an annual basis, and generates sufficient cash for periodic renovation of the installations and materials, and for innovation and eventually expansion.

In this section of the paper we focus on the financial aspects of running a viable whitewater centre. Other important aspects, like in any other business, are the quality, experience and motivation of management and staff, and the policies and actions in the field of marketing and communication, amongst others.

We exclude from this financial exercise the initial capital investment to construct the centre and the impact of its depreciation. We take as an assumption that this investment is borne by public and/or private institutions, resulting in the nomination of a site as organiser of a major competition, or for strategic reasons to promote a particular region. Whether part or all of this initial investment can be recovered will depend primarily on the number of customers the site can attract, and thus on its location and area of influence.

3.3 Finance – Profit & Loss Statement

| GENERIC PROFIT & LOSS STATEMENT FOR WHITE WATER VENUE | | | | | |
|--|------------------------|-----------------------|-----------------------|----------------------|-----------------------------------|
| K€ (1,000 €) | HIGH SEASON | MID SEASON | LOW SEASON | FULL YEAR | % of total revenue |
| | May>Aug | Mar/Apr, Sep/Oct | Nov>Feb | | |
| REVENUE | 934 | 242 | 24 | 1,200 | 100% |
| SPORT ACTIVITIES | 295 | 118 | 5 | 418 | 34.8% |
| RECREATION ACTIVITIES | 387 | 74 | 9 | 470 | 39.2% |
| OTHER COMMERCIAL ACTIVITIES | 252 | 50 | 10 | 312 | 26% |
| OPERATIONAL EXPENSES | 451 | 237 | 273 | 961 | 80.1% |
| PURCHASES | 58 | 19 | 6 | 83 | 6.9% |
| PERSONNEL COSTS | 259 | 151 | 145 | 556 | 46.3% |
| UTILITIES | 12 | 11 | 41 | 64 | 5.3% |
| MAINTENANCE & REPAIR | 18 | 12 | 13 | 43 | 3.6% |
| MARKETING & COMMUNICATION | 4 | 1 | 0 | 5 | 0.4% |
| PROFESSIONAL SERVICES | 2 | 2 | 3 | 7 | 0.6% |
| INSURANCE | 6 | 5 | 5 | 16 | 1.3% |
| RENTAL | 11 | 0 | 3 | 14 | 1.2% |
| OTHER | 81 | 36 | 57 | 173 | 14.4% |
| EBITDA | 483 | 6 | -249 | 239 | 19.9% |
| FIXED ASSETS & EQUIPMENT DEPRECIATION | 64 | 64 | 64 | 192 | 16% |
| EBIT | 419 | -58 | -313 | 47 | 3.9% |
| FINANCIAL EXPENSES | 7 | 7 | 8 | 22 | 1.8% |
| EBT | 412 | -65 | -321 | 25 | 2.1% |

KEY ASSUMPTIONS (BASED ON EMPIRICAL DATA)

- Three seasons to run activities: high–mid–low, each 4 months
- Number of athletes: 15,000
- Number of customers:
 - canoe: 24,000
 - rafting: 14,000
 - other (hydrospeed, open kayak, BTT): 4,000
 - total: 42,000

Pricing of key recreation activities :

- canoe: average list price 12.5 € – average selling price 6.1 €
- rafting: average list price 36.0 € – average selling price 17.1 €

Average annual auto-financed investment: 100,000 €

Capacity limit to offer quality service: 100 pax/hour – 600 pax/day

Staff: 23 pax

Impact of corporate taxes excluded (analysis up to EBT)

3.4 Marketing

The Olympic Games competitions are an excellent launching platform for whitewater activities. The Olympic images and the Olympic iconic atmosphere remain for a long time as an active marketing asset.

Similarly, Continental and World canoeing competitions, if properly associated to the centres and their activities, can spread a very positive message about the centre.

Marketing actions addressed to target areas are essential to promote and sell the products offered at the venues.

Canoeing development actions, mainly addressed to younger generations, are a long term investment. Together with schools this can help social synergies between education and sport.

3.5 Multiplier impact on the region

Last but not least, it is important to refer to the multiplier impact of whitewater centres:

Visitors are not only spending money on site, but their presence also create wealth, encourages the rise of collateral businesses and creates employment opportunities in the region.

The average daily spend by tourists is 107 € per head, according to a study performed in Spain. If we apply this rate to our specific case, with 42,000 visitors, we are talking of a global annual spend of 4.5 million euros.

4.0

Conclusions and recommendations

CONCLUSIONS:

- Canoe sport can be subsidised by commercially orientated activities;
- Canoe sport should be preserved in the preliminary management agreements;
- A **Master Plan** should be the preliminary document to prepare the project;
- The **Concept Design** must be related to the environment;
- The project should combine sport requirements and management operations;
- Employment will be temporary, according with seasonal activities;
- There are key factors for a sustainable economy;
- A **Business Plan** to ensure the venue generates a positive cash flow available for investment in renovation, innovation and expansion;
- A whitewater centre can be run profitably and at least breakeven;
- The investment capital construction cost is difficult to recover totally through operation;
- Experiences in different sites of the world prove it can be sustainable business;
- As a consequence of the seasonal nature of the business, cash management is critical and should be addressed on a monthly basis to manage efficiently the peaks in the cash balance;
- It is obvious that the picture described will change according to the function of the location and its climate conditions;
- The economic and social impact to the region is significant.

Whitewater canoeing centres are facilities to share sport and recreation; they can regularly host competition events; they can be economically sustainable, balancing the expenses and income. The sport and commercial activities generate jobs, and the indirect jobs and induced multiplier effect have a positive impact on the region.

RECOMMENDATIONS:

- Competition course with a maximum 12 m³/s flow;
- Limit the investment to 10 million euros;
- The design can be functional, with austerity;
- The canoe sport programmes should be mindful of operation costs;
- In the Financial Plan consider all the actual costs, including operational equipment costs;
- When planning a second whitewater course for canoeing development, using the same pumping station would permit operators to build a longer intermediate level course.

5.0

Ramon Ganyet

Ramon Ganyet is a civil engineer with an economics degree. Designer of Parc Olímpic del Segre for the 1992 Barcelona Olympic Games, he has a broad experience in national and international canoe whitewater projects. As a mountain engineer he has conducted several projects on ski resorts in the Pyrenees.

He received the IAKS 1995 award for integration of sport and environment in Parc del Segre and the IAKS 2010 award for persons with disability ski plan and projects in La Molina.

The concept design of combining canoe sport with commercially oriented recreation activities has been developed over 25 years operation in La Seu d'Urgell.

As competition venue manager, Ramon Ganyet has conducted Olympic and ICF canoe slalom competitions over 35 years.

From 1988 to 2000 he has been a member of the ICF canoe slalom and whitewater committee.

He has contributed to the evolution of the slalom discipline and analysed the progress of the design of new whitewater venues.

Carl De Smedt

Carl is currently combining his activities as financial consultant with part-time CFO positions in two Spanish start-up companies. He is also an angel investor, board member and mentor in various other start-ups.

The industries he is specialised in are leisure & sport, entertainment, technology and healthcare.

During 7 years he occupied the position of CFO and Director of Corporate Services of the Andorra based company SAETDE, major shareholder of the Grandvalira ski-resort. He also led during this period the international expansion, via the subsidiary Pas Grau International, in Argentina, Spain and France, amongst other countries.

Before that he occupied senior management positions as CFO in major multinational companies : for 14 years with Novartis, both at the Swiss headquarters and at its Spanish affiliates, Black & Decker in Spain, Kodak and Arthur Andersen in Belgium.

Carl is Belgian, with an international background and experience in different cultures, as he has been living and working also in Switzerland, Spain, Andorra and Argentina, and exercised responsibilities over country operations in Latin America and Asia Pacific.

He has an MBA from the University of Leuven, Belgium, with postgraduates from Harvard (USA) and Insead (France).

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