THE BIODIVERSITY CLOSE AT YOUR EYES

Final report

September 2014

THE QUARRY LIFE AWARD

INDEX

The current proposal has been made for:

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1. SUMMARY

La Medina has got an important business activity to provide the material to build. The extract activity produces negative impacts close at the environment. The works done in the quarry generate new habitats, new refugees and new chances, and as a result the flora and fauna of these new habitats find an ideal place to live.

These new created habitats in the quarries are considered as a natural positive value. During the phase of exploitation exclusive habitats are generated for many species as flora as fauna. We have to preserve them as musch as possible during the exploitation phase and closing phase as well. These new habitats should be one more element in the environment.

The actions which we want to carry out during the project should change the consideration of this type of activity as a new environmental opportunity for study, preservation and dissemination.

One of the best ways to appreciate our environment is through knowledge, and the best tool to carry out this task is the dissemination. Our project aims to spread these positive values to people. The actions used are: on the one hand an interactive itinerant exhibition to show the important and necessary industrial activity and the natural values; and on the other hand an interpretative path sourronding the quarry to see ourselves the natural riches of La Medina

These activities are specially designed for local population and the schoolchildren in the close area of La Medina. The local population will have the itinerant exhibition and the interpretative path for 17 workshop while the schoolchildren will use the itinerant exhibition and join the complementary workshops of geology, also for 17 workshop.

The itinerant exhibition will move to the available places of the close councils to the quarry such as community centers, associations, etc. In the case of schools the itinerant exhibition will move throughout the schools close council to the quarry as well.

Our connection with the population to disseminate our positive message is the itinerant exhibition called **"Life in the Rock".** So our main goal is to have a clear, simple and didactic message in each 8 rollers contained in the exhibition; this effort also incluide the interactive part in the exhibition with some types of rocks and a recording of the sounds in the quarry.

2. INTRODUCTION

The biodiversity is the greatest richness of our planet, because it has ensured the conservation of life during the different geological processes to the Earth. **"The biodiversity close at your**

eyes" is the name of a project whose objective is the dissemination of positive values that exist during and after the activity in the quarry La Medina. The conservation of biodiversity in a quarry is important because there is a connexion between all species of each ecosystem, also because it is a source of new materials for industry , and because it is the source of many medicine, because several species contain genes that we could use to improve other species; definitely biodiversity improves the quality of human life because we need other species for our own profit.

"Life in the rock", "Biodiversity in the quarry " and "Living the quarry" are the titles of three different actions. The project with these titles tries to disseminte an important message to the population.

3. OBJETIVES

- To know the natural value of the quarry La Medina.
- To know the ecological niches of the quarry La Medina.
- To disseminate the environmental conservation activities in the quarry.
- To sensitize the population about the developed action in the quarry for the environmental conservation.
- To show an important and necessary industry activity.
- To cooperate with the environmental education at schools.

4. INFORMATION

QUARRY "LA MEDINA"

The quarry La Medina is located in the Council of Oviedo in Asturias. It is a limestone quarry whose extraction began in 1964. In 1999 Hanson Hispania acquired Mechanical Cárcabas Canteras SA and in 2007 HeidelbergCement Group adquired Hanson PLC. The joining between these groups became the third producer group of aggregates in the world.
The quarry labours include drilling and blasting of the rock, also the transport and classification of the materials in the treatment plant.
Of the four types of soil orders present in Oviedo the Inceptisol is the most abundant in the exploitation.
The area where the quarry is located has got the oceanic-humid temperate climate according to the climates of the iberian penisula.
While minerals are being extracted in the quarry La Medina new ecological niches are being created as well. And they add to the local habitats. These habitats could be classificated so:

- Local habitats: Flora and fauna that they always have existed and currently live with the exploitation. They are woods, brushwoods and pastures.
- Exclusive habitats: Flora and fauna inside the quarry. Open areas with rocky ground where there are brushwoods, dispersed pastures and the wetland.

The inventory of species of these different habitats could be consulted in the annex 2 and 3.
The place of the quarry is not include of any protected natural area; the nearest protected area is the partial natural reserve called **La Cueva de las Caldas,** that is situated in a distance of 960 metres to the east of the quarry. It is a karstic cave on limestone mountain. Its interest is mainly cultural and biological because this cave is the habitat of bats whose survival depends on to preserve these caves.

5. METHODOLOGY

The methodology as the design as the development of the project "Biodiversity reach your eyes" is based on the basic principles of environmental education and interpretation besides all the activities achieve with the following principles:

- All activities must seek the fun and entertainment of its participants so they are **pleasant**, **inspiration** and **participative**. So The participants can be motivated themself about the increasing towards the environment.
- All the actions to develop and their activities must be **relevant** and **significat**. The teamwork who carry out each activity should adapt it with the skill to the visitor so we ensure that the transmitted message will be significant and relevant.
- The environmental instructor must make a previous analysis of the skill of the participants. Thanks to that we could adapt each activities at each different groups. The activities will be **flexible** and **dynamic** for allowing to the participants to assimilate the message and to build themself their own knowledge.
- For achieving the objectives for each activities are essential to have an **organized** information of each activity and to have a defined topics as well.
- In order to achieve a participatory experience the instructors should work as a **team**.
- Generally the organized activities of each programs encourage the **creativity**, the **critical analysis** and the **reflection**. The purpose is to make a critical analysis of their actions and to change their habits towards to the respect.
- The responsibility of the workteam should be **consistent** with the methodology, the objectives and the message that they want to disseminate.

5.1. PARTICIPANTS

The Project are conducted for two types of groups: local population and schoolchildren. The development of this activities should carry out with a work team of environmental education. So they could adapt the activities to the specific participants.

These groups of participants are:

- Schoolchildren at Secondary School close to the quarry.
- Local population (social center, association center, etc.) close to the quarry.

The main goal to choose these participants is to connect with the local population and to show them a positive image of the quarry. So we change about the negative feeling of this type of industrial activity.

5.2. ACTIONS AND SCHEDULE.

The actions that we propose are designed to acquire a new point of view of the quarry. The actions are the following:

5.2.1. For schoolchildren:

- **Itinerant exhibition called "The life in the rock".** This exhibition wants to bring the schoolchildren to the quarry, as the schoolchildren cannot move to the quarry. So the exhibition would move for 17 Secondary School.
- **Workshops for schoolchildren called "Biodiversity in the quarry".** It will be complementary workshop joining to the itinerant exhibition, so they will complement the schoolchildren activity with didactic worksheet and geological experiment.
- **Interpretative route "Living the quarry":** If it was possible to do an interpretative route for schoolchildren it would be made. The quarry manager could organise the schedule of this activity mainly for security.

5.2.2. For local population:

- **Itinerant exhibition called "The life in the rock"** This exhibition wants to bring the local population to the quarry. The exhibition will move for social center, association center, etc.
- **Interpretative route "Living the quarry":** The local population could see ourselves the natural riches of La Medina through the marked route. In this way they could know the quarry "in situ".

5.2.3. Schedule:

The task to develop are the following:

1	Review the biological biodiversity study.
2	Design the contents and the development of each rollers.
3	Promotion of the activity of each school center, social center and association.
4	Period of time to enroll and then there will be the selection of each participants (depend on the order of the enrolling list)
5	Development of 17 workshops for schoolchildren.
6	Development of 17 workshops for local population.
7	Final reports.

The development schedule would be the following:

MONTH	1	2	3	4	5	6	7	8	9	10	11	12
ACTIONS	1		2				5					7
			3		4		6					

6. RESULTS

6.1 ESTUDY OF THE BILOGICAL DIVERSITY.

We have developed a study of the flora and fauna surrounding to the La Medina. We have made a new inventory of flora and fauna in each different found habitats in the quarry. It could be consulted in the annex 2 and 3. These habitats of the La Medina could be classificated so:

- **Local habitats:** Flora and fauna that they always have existed and currently live with the exploitation. They are woods, brushwoods and pastures.
- **Exclusive habitats:** Flora and fauna inside the quarry. Open areas with rocky ground where there ara brushwoods, dispersed pastures and the wetland.

6.2 OBSERVATION OF THE NATURAL RICHES.

We have made an interpretative route surrounding the quarry where we have marked 7 spots of observations so we can see ourselves the most biologically riches of La Medina.
This activity called "**Living the quarry"** is a guided tour. It could be consulted in the annex 1. The main target of this activity is the local population close to the quarry. We have made a study of population to establish the group of people to whom we would like to offer the activity to. It could be consulted in annex 4.
This activity is complementary with the itinerant exhibition that is explained in the following paragrah. There would be 17 workshops for local population whose contents consists in a

guided visit of the itinerant exhibition in public locations such as community centers, associations in the councils and a guided interpretative route surrounding the quarry La Medina.

6.3 ITINERANT EXIBITION.

"The life in the Rock" is the name of the exhibition whose interpretive content are releated to the quarry La Medina.
The contents of the exhibition are divided into 8 rollers with the following titles:

- La Medina quarry is more than rocks.
- Rocks are useful for what?
- Plants at rocks' edges.
- Animals at rocks' edges.
- Plants that love the rock.
- Animals that love the rock.
- Naked rock and wearing rock. Restoration.
- Rocks' future in La Medina quarry.

The contents of each 8 rollers is available in the annex 5.
Also the exhibition has got an interactive section with these contents:

- **"The family of a rock".** It is an exhibition of different types of rocks (sedimentary, igneous and metamorphic) and some extracted rocks of La Medina.
- **"Life in the rock through the sounds of the Medina**". It is a recording of ambient sound of the quarry.

This exhibition would move to schools and councils close La Medina. Thera are an inventory of potential places to move the exhibition. It could be consulted in the annex 4.

6.4 WORKSHOPS FOR SCHOOLCHILDREN.

"Biodiversity in the quarry" is the name of the environmental education workshops for schoolchildren. This workshop for schoolchildren is destined for chiledren from 12 to 16 years old. This workshop includes the guided visit to the itinerant exhibition whose explanation will be adapted to the level of the students and also the workshop will have teaching material releated to the quarry and some gological experiments. The teaching material and geological experiments can be consulting in the annex 6.
There will be a organisation between the mobility of the itinerant exhibition in the councils and at the schools.

6.5 FINAL REPORTS.

As all of proyect of environmental education, the final report would be difficult to make because we would evaluate behaviors. However in this case the participant interaction with the local population could use to show an industrial activity closer to the people. Besides all information about the activities done could be usefull to understand to the population and Heidelbergcement could use these feed-back to listen the worries of the population related to the quarry.
All information achieved would use to make a final report (it be described en the section number 9).

7. DISCUSSION

The extractive activity is a method for obtaining the required resource even though it leads to an evident enviromental impact. But, at the same time it creates new ecological niches and habitats for relevant species, Beside, when finisihing an exploitation the well performed restoring projects help towards a fast recovery of the biological diversity of the area and ana improvement of the visual impact.

It is of high interest to reach the society to spread this message, and show the people the natural riches and the diversity of the quarry. This activity will have a very positive effect on the society´s perception about La Medina, showing its interest in the environment.

8. CONCLUSSION

The project "**Biodiversity close at your eyes**" could begin to be applied immediately during the current extraction phase in the quarry La Medina. Also this project could continue for next years with an expansion with new editions because the timing of this project would be for one year with 17 workshops for local population (itinerant exhibition and guided route) and 17 workshops for schoolchildren (itinerant exhibition and complementary workshop). It could be considered a more ambitious possibility including more councils and schools of Asturias.

9. EVALUATION

We would make continuous checks while the activities are developing .To do that we would use surveys. These surveys are delivered at the end of the activity for the local population and

in the activity for choolchildren the surveys are delivered to the tutor of each class or group an the end as well.

You can see an example of survey in the annex 7.

Another way to achieve information is **the light**. The light could be used in workshop for local population. The light consists to give an opinion using three urns: one red, one orange and the last one green. The participants could write in a piece of paper a small note and if the note is something what they didn´t like they should put in the red urn, if the note is a suggestion in the green urn and if the note is a recomendation to improve the activity in the orange urn.

This method used in the light would permit to have information about all the participants, which we would analyse after each section.

We are checking the surveys while the proyect are developing and depend on the results and the stage of the project we could do some changes or improvement as during the development as the future editions.

At the end the project we would make a final report to Heidelbergcement for checking the significance of this project.

10. ANNEXES

10.1 ANNEX 1: SCRIPT FOR THE GUIDED TOUR *'LIVING THE QUARRY'*

The aim of this activity is the general public. It has a duration of three hours and thirty-five minutes, and its contents are distributed in two parts:

1. **Guided tour to the itinerant exposition 'Live in the rocks'**

The activity will begin with a welcoming to the public and a brief introduccion about the different activities and the time for each one of them.

Looking for a better interaction with the public, the guide will do some questions to the public about their knowleche of a quarry: what is it?, what kind of activities do happen in there?, what do you think about the quarries?, etc. The aim of these questions is to know the interests and knowledge of the group, so the guide will be able to adapt all the information of the activity to each group of visitors, doing it more interesting to them.

After the introduction, the guide will talk about the reason of these workshops. It will be said that this activity is possible thanks to the HeidelbergCement Group, by The Quarry Life Award, because they help to spread and to disclose conservation activities in this quarry. It will also be said that the aim of this activity is to give transparence to the important work of the quarry; it's an important place, with an important function, and it's happening right in front of us, here in La Medina quarry.

Then, the guide will talk about the title of the itinerant exposition 'Live inside the rocks', because the rocks are the truly protagonists of our exposition, and specifically limestone rocks, because this is the kind of rock we can find here, in La Medina quarry.

The itinerant exposition has eight rollers with these titles:

- La Medina quarry is more than rocks
- Rocks are useful for what?
- Plants at rocks' edges
- Animals at rocks' edges
- Plants that love rocks

- Animals that love rocks
- Nude rock and wearing rock. Restoration
- Rocks' future in La Medina quarry

FIRST ROLLER

We will start with the first roller **'La Medina quarry is more than rocks'**. The guide will start talking about the geographicall situation of the quarry and its beginning. History starts in 1964, when the activity of the quarry was responsibility of Canteras Mecánicas Cárcabas S.A. This group ruled the quarry until 1999, when Hanson Hispania bought the little company, and a few years after, in 2007, HeidelbergCement Group, with its central in Germany, bought Hanson Hispania. Nowadays, HeidelbergCement Group is the most important company in aggregates production.

It will also said the importance and the need of aggregates in construction, the quarries' activity bring more work to the population, directly and indirectly.

Materials taked nowadays in the quarry comes from limestone rocks. They are derivated materials with a lot of functions in construction: high quality clean aggregates, materials for refull, etc.

SECOND ROLLER

The next stop will be the second roller **'Rocks are useful for what?'**. The guide will explain here the characteristics of limestone rock, because this is the kind of rocks we can find in La Medina quarry. It is a sedimentary rock with a huge resistance to weathering, so it were used for sculptures and buildings in ancient times.

Nevertheless, the action of rain water and rivers (specially when it's acidified by carbonic acid) causes the dissolution of the limestone rock, and because of that the rock suffers another kind of weathering called karst weathering.

The guide will talk about the uses of the materials maded with limestone rock, specially about their use as a important cement component, and also about their importance to make quicklime (CaO) and slaked lime ($Ca(OH)_2$).

THIRD ROLLER

The next stop will be the third roller **'Plants at rocks' edges'**. The guide will talk about the plants that live near to the quarry, and also about the three different types of habitats that have existed and coexist nowadays near to the quarry. They are:

- Forests near to the limit of the quarry. We can find a mix of pines and oaks at the north limit of the quarry, and also some chestnuts and eucalyptus.
- Bushes, at the middle area, with different species like blackberry, heather and gorse.
- Meadows, at the eastern area, with different herbaceous species.

FOURTH ROLLER

The fourth roller named **'Animals at rocks' edges'** will be the next stop. The guide will talk about the animals that live inside the three habitats and come close to the quarry. The guide will give some examples of local animals from each group: amphibious, reptiles, birds and mammals.

FIFTH ROLLER

The next stop will be the fifth roller **'Plants that love rocks'**. The guide will talk about the plant species that live near to the quarry, inside new habitats that appear as a result of quarry's activity. In this case, the guide explain that we can find these habitats in open rocky field and also in the temporary weatland. The guide will name also some species, like *Tussilago farfara, Festuca indigesta* and other ruderal plants.

SEXT ROLLER

The sext roller **'Animals that love rocks'** will be the next stop. The explanation at this point will be similar to the previous roller. The guide will talk about the animals that live near to the quarry, inside those new habitats we talked about yet. As examples, the guide could talk about swallow, that use the rocks' hollows to make their nests, and also about bats and kestresl, that use the quarry for hunting. Some insects, like dragonflies, and birds, like herons, could be found at the temporary westland. It also will be said that these new habitats are the result of the quarry's activity, and they are in continue movement because of that activity.

SEVENTH ROLLER

The next-to-last roller is named **'Nude rock and wearing rock. Restoration'.** The guide will explain that all the activity at the quarry comes with a restoration plan; a group of actions, structured in different phases, with the aim of restore the environment. These actions are maded during and after the mineral extraction, and they are conservation activities like hunting close, drain network, water treatment, or remove

and store land, so it can be used to restore the environment after the extraction. Temporary restoration are also maded, as showed at the map in drops 6 and 7, but permanent restorarion will be made only after the end of the exploitation. This permanent restoration will be make by phases and the main actions are the drops restructuring, reconditioning and preparation of land, sowing and cultivating of local species, conservation of new habitats, etc.

EIGTH ROLLER

Last roller is named **'Rocks' future in La Medina quarry'**. The guide will talk about how the quarry will look like after the end of the restoration. It will also said that the company will check the status of the restoration and the results of the actions maded, in a short and in a long period of time. People could see a map about how the quarry will look like after the restoration.
Length: 30 minutes

2. Guided tour to marked interpretative route.

A brief introduction will be made about the tour, the marked route and the stops, so people coud see the biological richness of La Medina quarry. The guide could show the stops to the public using the *picture 10.1.9 Marked route in the map*, so they could see the stops over a map of the area.
The group will made seven stops, five of them will be outside of the quarry but near of it and the other two will be inside the quarry. Other stops could be maded too, by interests of the group.
The tour will start at the front door of the quarry, and will turn to the south by the outside of the quarry, following the Priorio road, so the group could observe the meadows. The first stop will allow to observe the meadow vegetation and also drops structure, from down to up.

Picture10.1.1 Meadows

Picture 10.1.2 South view of the quarry

After the first stop, the group will return to the start point, the front door of the quarry. The guide will talk then about security rules inside the quarry, so the group could visite the inside. People should wear helmet and safety vest, and use mobile phones will not be allowed in the inside; a employee of the quarry will help the guide on this matter.

Inside the quarry the group will walk through a hoppers area and also an aggregates transformation area, and arrive to the second stop. In this place people could see the difference between extraction area and restoration areas.

Picture 10.1.3 Temporary restoration

Picture 10.1.4 Temporary weastland

The tour will continue by the road, to see the temporary westland area. People could see some species of the open rocky field by the way. The third stop of the tour will allow to see the temporary westland area. The guide will explain here that this area is temporary because of the seasons and the rains of each season.

After the explanations of this stop, the group will return by the same way at the front door of the quarry. The way turn to the north by the outside of La Medina quarry, and the group will be at the fourth stop. Here the group will be able to see a complete view of the quarry from the outside; they could see the forests and maybe some birds over the quarry, and they could see them closer because the guide will have binoculars.

Picture 10.1.5 Complete view from stop 4.

The tour will continue by the north way to the next stop, the fiveth one, at Esculca Fountain, when the group could drink and make a brief break. The guide will explain that this is a natural spring that was restored.

Picture 10.1.6 Sign from Esculca Fountain

The tour will continue from this point to the north, passing by some houses, until return to the road. Our tour will turn then inside the forest; the group will go into a forest made of pines, eucalyptus and chestnuts that make a nice road. People could find

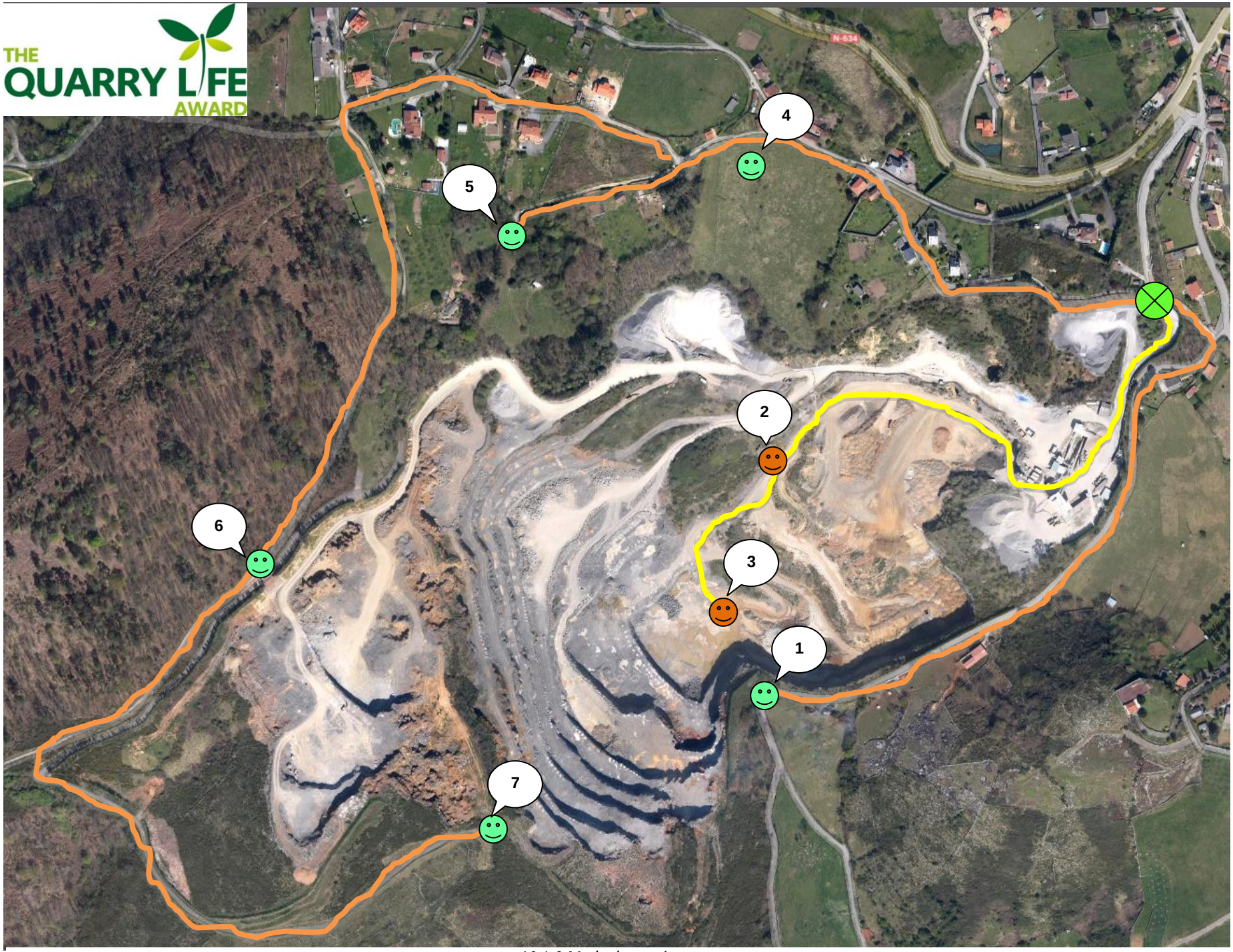
some animal prints on the ground, at this point of the tour. Then, the group will guide their steps to the sixth stop, when they could see the quarry from the top.

Picture 10.1.7 Overview of the quarry

The tour will continue from here to the highest point by the north face of the quarry. From that point the guide will explain what will be the extension area, and the group could also see an overview of all the habitats that coexist with the quarry.

Picture 10.1.8 Quarry overview from the highest point

Length: 3 hours.



10.1.9 Marked route in a map

10.2. ANNEX 2. PLANTS' INVENTORY

TREES
SCIENTIFIC NAME
Pinus radiata
Castanea sativa
Corylus avellana
Laurus nobilis
Pinus pineaster
Sambucus nigra
Cornus sanguinea
Eucaliptus globulus
Quercus robur

BUSHES
SCIENTIFIC NAME
Robinia pseudoacacia
Erica arborea
Potentilla erecta
Calluna vulgaris
Rhamnus alaternus
Rubus ulmifolius
Teucrium scorodonia
Erica cinerea
Vaccinium myrtilus
Ulex europaeus
Genista hispanica
Tamus comunis
Helleborus foetidus
Ulex europaeus
Daboecia cantabrica
Potentilla montaña

FERNS
SCIENTIFIC NAME
Dryopteris dilatata
Polystichum setiferum
Pteridium aquilinum
Blechum spicant
Dryopteris borreri

HERBACEOUS
SCIENTIFIC NAME
Tussilago farfara
Pennisetum purpureum
Trifolium pratensis
Trifolium repens
Festuca indigesta
Festuca rubra
Lolium multiflorum
Lolium perenne
Medicago lupulina
Cirsium vulgare

10.3. ANNEX 3. ANIMALS' INVENTORY.

AMPHIBIOUS
SCIENTIFIC NAME
Rana perezi
Rana temporaria
Salamandra salamandra
Triturus marmoratus
Alytes obstetricans
Bufo bufo
Bufo calamita
Discoglossus glagonoi
Hyla arborea

REPTILES
SCIENTIFIC NAME
Natrix maura
Podracis bocagei
Podarcis hispanica
Psammodrus algirus
Vipera seoanei
Lacerta lepida
Lacerta schreiben
Malpolon monspessulanus
Natrix natrix
Anguis fragilis
Chalcides chalcides
Coronella austriaca
Coronella girondca

BIRDS		
SCIENTIFIC NAME	**SCIENTIFIC NAME**	**SCIENTIFIC NAME**
Locustella naevia	*Regulus ignicapillus*	*Carduelis chloris*
Luscinia megarhynchos	*Saturnus unicolor*	*Certhia brachydactyla*
Miliaria calandra	*Scolopax rusticola*	*Locustella naevia*
Motacilla alba alba	*Sturnus vulgaris*	*Luscinia megarhynchos*
Motacilla cinerea	*Troglodytes troglodytes*	*Miliaria calandra*
Parus ater	*Accipiter gentilis*	*Motacilla alba alba*
Parus caeruleus	*Accipiter nisus*	*Motacilla cinerea*
Parus cristatus	*Aegithalos caudatus*	*Parus ater*
Parus major	*Alauda arvensis*	*Parus caeruleus*
Passer domesticus	*Alectoris rufa*	*Parus cristatus*
Passer montanus	*Anthus pratensis*	*Parus major*
Phoenicurus ochruros	*Anthus trivialis*	*Passer domesticus*
Phylloscopus collybita	*Athene nocturna*	*Passer montanus*
Pica pica	*Apus apus*	*Phoenicurus ochruros*
Picus viridis	*Buteo buteo*	*Phylloscopus collybita*
Prunella modularis	*Cardualis cannabina*	*Pica pica*
Pyrrhula pyrrhula	*Carduelis carduelis*	*Picus viridis*
BIRDS		
SCIENTIFIC NAME	**SCIENTIFIC NAME**	**SCIENTIFIC NAME**

Prunella modularis	*Carduelis cannabina*	*Emberiza citrinella*
Pyrrhula pyrrhula	*Carduelis carduelis*	*Erithacus rubecula*
Regulus ignicapillus	*Carduelis chloris*	*Falco peregrinus*
Saturnus unicolor	*Certhia brachydactyla*	*Falco subbuteo*
Scolopax rusticola	*Cisticola juncidis*	*Falco tinnunculatus*
Sturnus vulgaris	*Circaetus gallicus*	*Fragilla coelebs*
Troglodytes troglodytes	*Circus cyaneus*	*Garrulus glandarius*
Accipiter gentilis	*Columba palumbus*	*Hippolais polyglotta*
Accipiter nisus	*Corvus corax*	*Hirundo rustica*
Aegithalos caudatus	*Corvus corone*	*Jynx torquilla*
Alauda arvensis	*Coturnix coturnix*	*Lanius collurio*
Alectoris rufa	*Cuculus canorus*	*Turdus merula*
Anthus pratensis	*Delichon urbica*	*Turdus misicus*
Anthus trivialis	*Dendrocopos major*	*Turdus philomelos*
Athene nocturna	*Emberiza calandra*	*Tyto alba*
Apus apus	*Emberiza cia*	*Vanellus vanellus*
Buteo buteo	*Emberiza cirlus*	

MAMMALS	
SCIENTIFIC NAME	**SCIENTIFIC NAME**
Nectomys squamipes	*Mus musculus*
Oryctolagus cuniculus	*Mustela erminea*
Putorius putorius	*Mustela nivalis*
Pitymys duodecim costatus	*Apodemus silvaticus*
Ratus norvegidus	*Capreolus capreolus*
Ratus ratus	*Clethrionomys glareolus*
Sciurus vulgaris	*Crocidura russula*
Strix aluco	*Eliomys quercinus*
Sus acrofa	*Pipistrellus pipistrellus*
Talpa europaea	
Vulpes vulpes	
Erinacus europaeus	
Genetta genetta	
Martes foina	
Meles meles	
Microtus agrestis	

10.4. ANNEX 4. POPULATION STUDY

Here is showed a list of possible target audience for the activity of this project, as a result of population study about the influence area near to La Medina quarry.

1. Council of Grao.

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10.5. ANNEX 4. SCRIPT OF THE WORKSHOPS FOR SCHOOLCHILDREN

"BIODIVERSITY IN THE QUARRY"

Fiirstable the instructor will deliver the worksheet. This activity consists in 3 parts:

1. Guided visit to the itinerant exhibition "The life in the rock"

The instructor will make an explanation of each eight rollers to the exhibition (annex 1). The instructor will adapt the explanation to the level of the students.
There is a interactive part in the exhibition with two sections.

- The family of a rock; it is an exhibition of different types of rocks and a representation of some extracted minerals from the quarry La Medina.
- Life in the rock through the sounds; It is a recording of ambient sounds in the quarry.

One part of the worksheet is related to the interactive exhibition where the students should pay more attention. When the instructor explains the interactive exhibition the students should complete the part of the worksheet related to that because they should identify some rocks and some sounds.
Length: 35 minutes.

2. Worksheet.

After the instructor finishs the guided visit of the itinerarnt exhibition the students should finish with the rest of the worksheet.
An example of the worksheet is written below:
Length: 15 minutes.

TYPES OF ROCKS

Her you are there types of rocks: igneous, metamorphic and sedimentary.
Try to identify what are they?

_____

_____

_____

BIODIVERSITY IN THE QUARRY

Place the quarry in correct position in the map of Asturias.

THE BIO-DI-VER-SI-TY IN LA ME-DI-NA

IDENTIFY THESE SPECIES THAT ARE LIVING IN LA MEDINA

Flora:

_____

_____

Fauna:

_____

_____

_____

In La Medina there are limestone rocks. What are their industrial uses?:

_____

_____

_____

What happens when the acid rain drops into the limestone rock?

_____

_____

SOUNDS OF THE QUARRY. Try to identify what sounds have you listened in the audio?:

_____

THE QUARRY LIFE AWARD

3. Geological experiments.

When the students had finished the worksheet the instructor will move on to the the third part to the workshops called geological experiments.

- **pH of differents types of rocks.**

We have a pH-meter to measure the pH of different types of rocks. Previously the instructor will explain the meaning of the different ph values with examples. The 7 value is neutral, up to 7 value is basic and down to 7 value is acid. For helping to understand these values the instructor will talk about some examples: an example of acid could be the vinager and an example of basic could be toothpaste and an example of neutral could be the milk.

- **Acid activity in the limestone.**

The activity consists in placing a glass with vinegar (acid) and another one with sweet water and put inside the both glass a piece of the same limestone and then to observe the effects. The students could see as in a glass with vinegar will start to bubble while in the glass of water will not happen any reaction. The instructor will comment what the atmosphere contents carbon dioxide and when it rains the water drags the carbon dioxide and it will acidify. If this rain falls on buildings made of limestone rock, the rain creates some little holes in the surface of the building.

- **Stalactites and stalagmites manufacturing.**

The instructor explains that the stalactites and stalagmites are formed inside limestone caves. The stalactites and stalagmites cover roofs and cover the grounds. The process starts when the raindrops are filtered from the outside surface to the inside the cave. The instructor explains that the droplets carry dissolved carbon dioxide which gives them an acid character and the rock will dissolve. The drops fall in the floor of the cave and the water will evaporate leaving the deposited calcium carbonate. The instructor comments that it is a very slow process that takes thousands of years to make a estalatita or stalagmite.
We will carry to the scholl a finished experiment to see the result because to see the results inmediatly the students must wait several days.

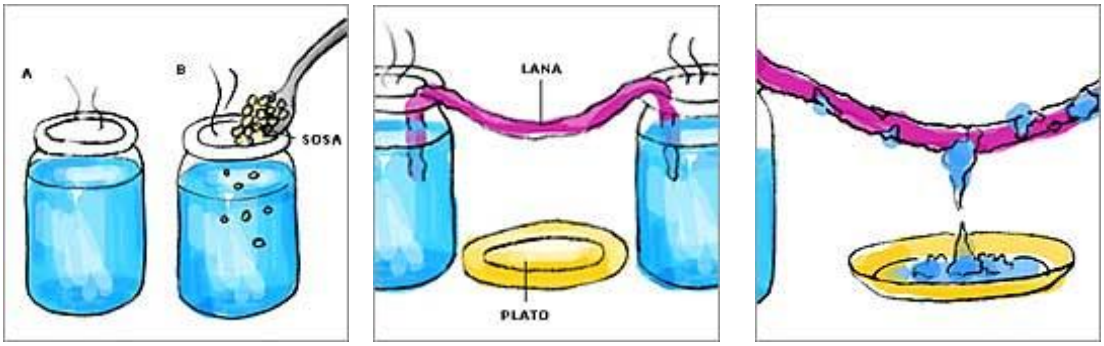
Materials required : Two glass, a saucer, thread of cotton, a pair of clips, water and salt.

Steps:

1. Prepare a saturated salt solution with hot water.
2. Fill two glasses with the prepared solution.
3. Put the saucer between the two glasses.
4. Attach two clips to the ends of a piece of cotton.
5. Put the thread of cotton inside the two glasses and a piece of thread has to be hanging over the plate.

The salt solution goes along the thread by capillary and some drops falls into the saucer. The water fallen from solution is evaporated slowly and the result is crystals of salt in the saucer.

The process is very slow and it takes a few days.



10.6.3.1 Made of geological experiment

- **To make sedimentary rocks.**

The instructor explains to the schoolchildren that we try to imitate the natural process as the deposited sediments a long millions of years. These sediments are transformed into solid rock.

Materials required : sand, colouring, putty, shells, petroleum jelly, a spoon, a plastic bottle, a pair of scissors and a bowl.

Steps:

1. Mix the colouring with wet sand and the putty.
2. Place eventually some greased shells with petroleum jelly.
3. Let to harden your "sedimentary rock" during a few days. After that cut the plastic bottle carefully and remove the plastic bottle avoiding to break the formed sedimentary rock.

4. Break some layers to locate the "shell fossil" and you could see how they have made marks on the rock.

The process is slow and it takes a few days.

10.6.4.1 Made of geological experiment

Length: 1 hour.

10.6. ANNEX 6. MODEL FOR PROJECT'S EVALUATION

Example of surveys for tutors / teachers that will be provided after finishing the workshops for schoolchildren called: **"Biodiversity in the rock":**

SCHOOL CENTER:.....
COURSE:.....
GROUP: .....
LEVEL: .....

VALUE THESE TOPICS FROM 0 TO 5 *(0: Low satisfaction; 5: High satisfaction)* MARK WITH A "X"

1. Value as global way the activities undertaken.

   0 1 2 3 4 5

2. The objetives set at the beginning of the activity are been achieved

   0 1 2 3 4 5

3. The contents of the activity is been set up to the level and age of the students or participants.

   0 1 2 3 4 5

4. The explanations of the monitor has been succesfull to transmit the contents of the activity.

   0 1 2 3 4 5

5. The used methodology was suitable to trasmit the message.

   0 1 2 3 4 5

6. The used material during the workshops has been suitable for this activity.

0 1 2 3 4 5

COMMENTS:.....
.....
.....
.....

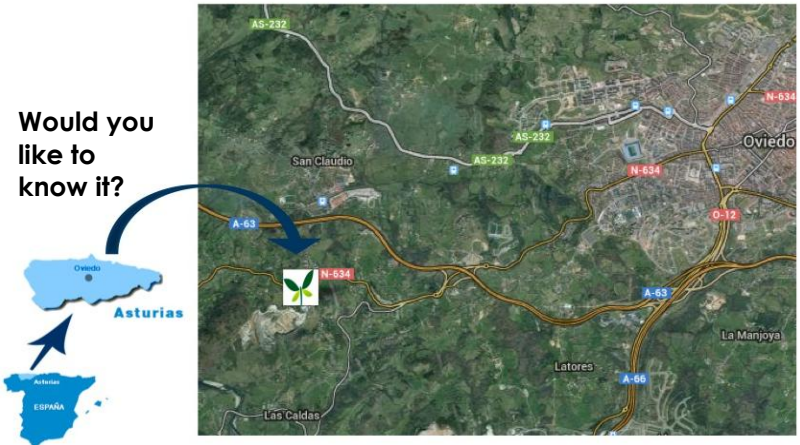
10.7. ANNEX 7. ROLLERS

La Medina quarry is more than ROCKS

THE LIFE IN THE ROCK

Near to the Oviedo, in Asturias, is located the quarry La Medina.

Would you like to know it?



A Little of history.....

1964

Canteras Mecánicas Cárcabas S.A

1999

Hanson Hispania

2007

HeidlbergCement Group

Currently…

World Leader in aggregates

THE QUARRY LIFE AWARD

ROCKS *are useful for what?*

What type of rock do you know?

Igneous

Igneous rocks are formed from cooled magma

Metamorphic

Metamorphic rocks are formed from other rocks which they did not melt but they were exposed to high pressure and temperature

Sedimentary

Sedimentary rocks are formed from sediments and some living being which they deposited by layers in the earth surface.

THE LIFE IN THE ROCK

What kind of rock is extracted from La Medina?

Sedimentary rocks

Limestone rock is a sedimentary rock. We are accustomed to see many buildings made of this type of rock. Did you know what many statues are made of limestone rocks?
Do you know the name of these statues?

¡Nice views!

Limestone rock undergoes karstification: water erodes the rock to form fissures and caves

…¿Do you know any kartic caves?

Usefull of the limestone rocks…

Cement

Calcium oxide

Marmoreal rock

THE QUARRY LIFE AWARD

Plants at ROCKS' edges

¿Quarry vs flora?

We might think that a quarry as La Medina impoverishes the environment, however there are many different habitats in the quarry……

HABITATS

THE LIFE IN THE ROCK

¿What is a habitat?

A habitat is an ecological area that is inhabited by particular species of animal, plant, or other type or organism

Habitats in la Medina

WOODS

BRUSHWOODS

PASTURES

THE QUARRY LIFE AWARD

Animals at ROCKS' edge

¿Quarry vs fauna?

The habitats of Woods, brushwood and pastures around the quarry are established with……..

THE LIFE IN THE ROCK

FAUNAL BIODIVERSITY

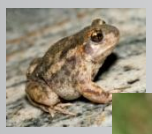
Fauna around la Medina

BIRDS

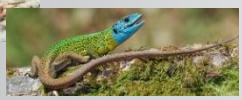
Buteo Buteo

Parus major

REPTILES Y ANPHIBIANS



Alytes cisternasii



Lacerta schreiberi

MAMMALS

Oryctolagus cuniculus

Rhinolophus ferrumequinum

¿Do you know any one else?

THE QUARRY LIFE AWARD

Plants that love **ROCKS**

Inside the quarry …

The exploitation in the quarry has generated new habitats that they are exclusive in the environment because they have got different species of vegetation.

FLORA IN LA MEDINA

THE LIFE IN THE ROCK

Tussilago farfara

Commonly known as coltsfoot is a wild plant that lives in rocky ground as la Medina.

¡¡Curiosity!! The coltsfoot is a medicinal plant commonly used to prevent illness to the respiratory system.

Smilax aspera

It is a climbing plant that lives together other brushwood.

¡¡Curiosity!! The amazon tribes use this plant to prevent the leprosy, the psoriasis or the dermatitis.

THE QUARRY LIFE AWARD

Animals that love the ***ROCKS***

Inside the rock …

Los diferentes ambientes de la cantera nos muestran la…

FAUNA IN THE MEDINA

THE LIFE IN THE ROCK

Steep walls

Wetland

THE QUARRY LIFE AWARD

Nude rock and wearing ROCK. Restoration

All kind of exploitation as La Medina includes a.....

RESTORATION PROJECT

THE LIFE IN THE ROCK

Exploitation phase

- Remove and supply to the earth.
- Front of vegetation.
- Pantalla vegetal.
- Drainage system.
- Water system treatment
- Temporal wetland.
- Etc.

Final Restaration phase

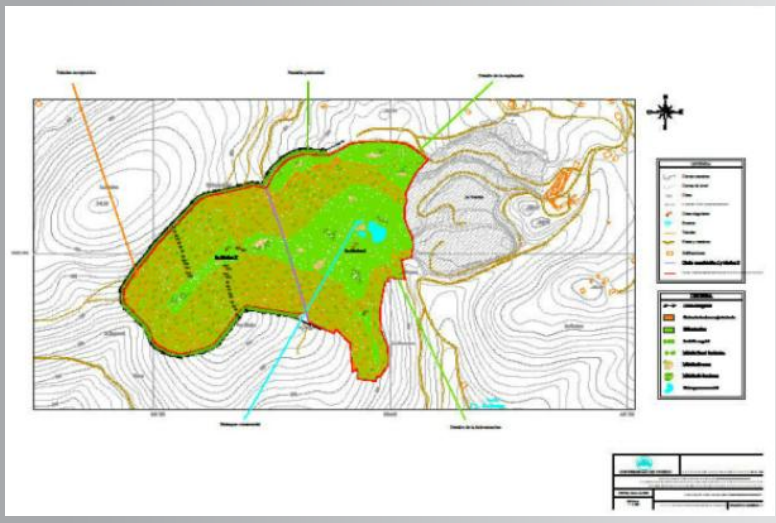
- Restyle slopes.
- Remodeling to the surface.
- Sowing to the ground.
- Cultivated field of native species.
- Preservation of exlcusive generated habitats during the exploitation phase.
- Etc.

THE QUARRY LIFE AWARD

ROCKS' future in La Medina quarry

How will be the future?

The exploitation of La Medina quarry includes a restoration project to return to the ideal conditions. **Do you know the change?**



THE LIFE IN THE ROCK

The restoration will bring new **ecological niches** like this wetland.

What new species colonise that ecological niches?

THE QUARRY LIFE AWARD