1. Basic Information

1.1 Project Number: 2002/000-608.13.02

1.2 Project Title: Sewage System Horni Benesov – stage II

1.3 Sector: CBC, Environment

1.4 Project Location: Horni Benesov, Silesia, Czech Republic

2. Objectives

2.1 Overall Objective(s)
The project is in compliance with the Joint Programming Document (JPD), Czech Republic - Poland medium-term strategy and priorities for the Phare CBC programmes. The project meets the objectives of the environment protection Priority. The project aims at:
- Improvement of the quality of surface water feeding into border rivers and protection of cross-border watercourses;
- Stricter ground water protection measures on both sides of the border, especially in Protected Landscape Areas, and more rigorous protection of ground drinking water sources;
- Elimination of the surface water cross-pollution by municipal waste water discharges into border rivers.

2.2 Project Purpose
Reduced contamination of watercourses flowing to Poland
The implementation of the project shall provide for reduced contamination of the Čičina river (see the figures below) and subsequently of the Opava river, which is a border river between the Czech Republic and Poland. The Opava river flows into the Odra river which crosses entire Poland. Implementation of the project and full utilisation of the Waste Water Treatment Plant after two years of operation will result in decrease of pollutants in the Čičina river as follows:

<table>
<thead>
<tr>
<th>Unit (mg/l)</th>
<th>Before implementation</th>
<th>After implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOD</td>
<td>59,4</td>
<td>6,2</td>
</tr>
<tr>
<td>COD</td>
<td>139,6</td>
<td>32,5</td>
</tr>
<tr>
<td>P</td>
<td>0,6</td>
<td>0,3</td>
</tr>
</tbody>
</table>

Reduced pollution of waste waters
The project implementation will allow the connection of approx. 80% of the population and local entrepreneurs in Horni Benešov (approx. 2,020 equivalent units during the implementation of the project and 900 equivalent units in the future) to the new Waste Water Treatment Plant, thus reducing the environmental load of soil caused by waste water in the area of Horni Benešov. The sewer connection of planning equivalent units will be achieved together with the following quantitative reduction in pollutants:

<table>
<thead>
<tr>
<th>Unit (mg/l)</th>
<th>Before project implementation*</th>
<th>After project implementation**</th>
<th>Norms CR</th>
<th>Norms EU</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOD</td>
<td>311</td>
<td>11,4</td>
<td>30</td>
<td>25</td>
</tr>
<tr>
<td>COD</td>
<td>-</td>
<td>42,5</td>
<td>120</td>
<td>125</td>
</tr>
<tr>
<td>NL</td>
<td>298</td>
<td>19,5</td>
<td>30</td>
<td>60</td>
</tr>
<tr>
<td>N - total</td>
<td>53</td>
<td>9,9</td>
<td>-</td>
<td>15</td>
</tr>
<tr>
<td>P - total</td>
<td>-</td>
<td>1,9</td>
<td>-</td>
<td>2</td>
</tr>
</tbody>
</table>

* Values of pollutants discharged by existing surface-water sewerage into the water stream Čičina without treatment
** Values at the discharge from the WWTP after the connection of approx. 2020 - 2920 (after one year of operation)

Reduced pollution of ground waters in the Jeseniky Protected Landscape Area
The project will also improve the ground and surface water protection in the Jeseniky Landscape Protected Area (Jeseniky CHKO) where the site is located.
Enhanced attractiveness of the border region for business
It is expected that the availability of a new infrastructure will result in an increased demand for unused land for housing and commercial development including SMEs, especially in the area of services and tourism.

2.3 Accession Partnership and NPAA Priority
Enhanced quality of the environment and partial compliance with EU environmental standards as well as economic development promotion fall into the set of the country's pre-accession priorities.
The project is in line with the Accession Partnership and National Programme for the Adoption of the Acquis (NPAA) objectives relating to the environment protection and economic development.

2.4 Cross-border Impact of the Project
Čížina and Opava watercourses are located in the Odra river basin, which is a source of drinking water for the population, industry and agriculture in Poland. The project implementation will improve the water quality of the Odra river thus improving the relations between the Czech Republic and Poland in terms of water quality in border rivers and watercourses.

3. Description

3.1 Background and Justification
Horní Benešov with the population of 2,521 is situated in the Jeseníky mountains about 20 km far from the Polish border and in the Jeseníky Landscape Protected Area. The Jeseníky region is among the regions with the highest unemployment rate in the Czech Republic (16.8%). There is a public water pipeline and natural gas supply system in the town, however, the issue of waste water management has not been fully addressed yet.

In 2001 Stage I of the sewage management project was completed under which a new mechanical and biological waste water treatment plant was built and a sewage pipeline laid in the total length of 3,400 m in Luhy quarter (300 equivalent units). The WWTP has a sufficient capacity of 3,800 and up to 5,000 equivalent units and the quality of treatment complies with the relevant EU requirements and standards. At present, most of waste water is either transported via an old sewage system (50 – 150 years old) with a high leak rate or via open trenches and discharged without any treatment into the Čížina river. Therefore, only 33 % capacity of the new waste water treatment plant is used. The waste waters from one bigger industry firm and from one smaller agriculture firm are treated independently by their producers (in line with EU legislation - Directive 91/271/EEC and Directive 86/278/EEC). In line with the latest Czech legislation the waste water from sumps in five adjacent communities will be transported to and processed subsequently in the waste water treatment plant.

The quality of the environment on both sides of the borders is not in compliance with EU legal requirements and standards. The project objective is to implement Stage II of the sewage management plan under which 80% of waste water produced by the population and industrial sector in Horní Benešov will be transported via the main sewer and treated in the waste water treatment plant in compliance with EU standards.

The last action planned in Stage III addressing the construction of a new sewage system for the intended housing development in the area situated above the town will include the construction of a system in the total length of 2,300 m (app. 650 equivalent units).

3.2 Linked Activities
Development of a robust technical infrastructure - sound wastewater management, in particular - seems to be the absolute prerequisite providing for all related projects focusing on regional economic development. The following related activities were or have been undertaken in Horní Benešov to date:

- 1999 - 2000 gas penetration project;
- 1999 - 2001 conversion of municipal block boilers to gas;
- 1999 - 2001 construction of the waste water treatment plant and sewage system Stage I;
- 2001 - 2002 reclamation of the household waste dump site.

3.3 Results
The project is focused on the construction of a new section of a sewage system network in Horní Benešov. The project shall deliver the following result:

- A new sewage system for 2,020 equivalent units in the total length of about 6,800 m of the main sewer and 300 access lines.

3.4 Activities
The project implementation as planned shall include all construction works required for the construction of the main sewer and its connection to the new waste water treatment plant. The implementation shall include the following:

- Pipe jacking (minitunneling) under road I/11;
- Construction of the main sewer in the total length of 6,800 m, DN 150 - 600, PVC;
- Installation of two pump stations;
- 300 sewage access lines in the total length of 1,500 m, DN 160 - 200, PVC;
- Excavation work;
- Blasting of hard rock bed;
- Structural reinforcement of four buildings (reinforced concrete structures and grouting);
- Resurfacing of roads in the total length of about 6,200 m;
- Resurfacing of pavements in the total length of 3,900 m;
- Relaying of water pipeline, Low Voltage and High Voltage power cables and telecom cables in the total length of about 1,800 m.
3.5 Lessons learned
Conclusions and recommendations of interim evaluation, monitoring and assessment reports of the previous Phare CBC programmes have been considered and incorporated into the project design.

4. Institutional Framework
The National Aid Co-ordinator (NAC) has an overall responsibility for programming, monitoring and implementation of the Phare programme. The National Fund (NF), managed by the National Authorising Officer (NAO), will supervise financial management of the programme and will be responsible for reporting to the European Commission.

The Ministry for Regional Development, in co-operation with the Centre for Regional Development, is the programme Implementing Agency (IA) with the overall responsibility for the project implementation. The NF will be transferring funds from the Phare resources to accounts managed by IA as authorised by the Financing Agreement signed between the MF/NF and IA.

The IA is managed by the Programme Authorising Officer (PAO) nominated by the Ministry for Regional Development and approved by the NAO and agreed by NAC. The PAO is responsible for all activities of the IA.

The investor is responsible for the Czech share of co-financing, for acquiring the planning consent and building permit, for preparing and launching the tender for a contractor, contract development, supervision of the works and for the final acceptance.

Project owner/beneficiary: Město Horní Benešov
Address: Masarykova 32, 793 12 Horní Benešov, okr. Bruntál
Represented by: Ing. Josef Klech, Mayor of Horní Benešov
Phone: +420 646 773080
Fax: +420 646 773081
E-mail: hbenesov@hbenesov.cz

Ing. Ivan Velebnovský (authorised person) will be appointed as a construction site supervisor.

The owner and operator of the project will be Horní Benešov municipality.

5. Detailed Budget (MEUR)

<table>
<thead>
<tr>
<th></th>
<th>Phare</th>
<th>Total Phare (=1+IB)</th>
<th>National co-financing*</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Investment Support</td>
<td>Institution Building</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction works</td>
<td>2.250</td>
<td>0</td>
<td>2.250</td>
<td>0.750</td>
</tr>
<tr>
<td>Total</td>
<td>2.250</td>
<td>0</td>
<td>2.250</td>
<td>0.750</td>
</tr>
</tbody>
</table>

The national share of funding will be partly provided from the beneficiary’s own sources and a bank loan.

6. Implementation Arrangements

6.1 Implementing Agency
The Ministry for Regional Development in conjunction with the Centre for Regional Development CR.
PAO: RNDr. Jiří Horáček, director, Department of EU programmes, MRD CR
Address: Staroměstské nám. 6, 110 15 Praha 1
Phone: +420-2 2486 1398
Fax: +420-2 2486 1415
Implementing Agency:
Director: RNDr. Ivo Ryšlavý
Address: Centre for Regional Development, Vinohradská 46, 120 00 Praha 2
Phone: +420-2 27 158 285
Fax: +420-2 27 158 229

6.2 Non-standard Aspects
The project will be managed using the methodology specified for Candidate Countries in the manual for the management of programmes supported from the EU sources – Phare Decentralised Implementation System (DIS Manual), in its latest update of
6.3 Contracts (MEUR)

<table>
<thead>
<tr>
<th>No.</th>
<th>Type of contract</th>
<th>Description</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Works contract</td>
<td>Construction of the sewer system</td>
<td>3,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td>3,000</td>
</tr>
</tbody>
</table>

7. Implementation Schedule

- Start of tendering*: 10/2003
- Start of project activities: 05/2004
- Project completion: 07/2005

* The tender dossier shall be submitted to the European Commission six months after the signature of the Financing Memorandum at the latest (see FM, Chapter Implementation Arrangements).

8. Equal Opportunity

Principles and procedures applied during the project implementation will ensure equal opportunities for all participants of the project.

9. Environment

Environmental Impact Assessment was carried out in line with 244/1992 Act on EIA and in line with the EU legislation. The EIA study was developed in November 2001 by Ing. Pavel Dočkal, CSc. – Aquachemie, Varenská 49, Ostrava 1 who is certified for EIA. The document is filed with the project owner – Horní Benešov municipality.

The EIA study has considered the sewers as well as the newly constructed treatment (all three stages). The project implementation will result in the reduced pollution of watercourses in the Czech Republic and Poland. The proposed project is in line with the long-term development strategy of the region and priorities set for the environmental improvements. The project after its implementation will deliver the compliance with the binding Czech and EU standards for water protection. The project is recommended for the implementation in the proposed scope and in the shortest time possible.

10. Rates of Return

The economic rate of return is based on the project feasibility study. The period assessed has been determined for 30 years to comply with the depreciation period of the investment.

IRR = 6.47%  

The feasibility study was elaborated by: Horní Benešov local authority, contact person – Ing. Josef Klech, phone: +420646/773 080, Ing. Ivan Velebnovský, phone: +420 69 662 73 71.

11. Investment Criteria

The following evaluation criteria are in line with the project feasibility study outcome.

11.1 Catalytic Effect

The project is of public nature and complies with the regional priorities. In the years to come, the action could not be implemented without support from the EU sources.

11.2 Co-financing

The co-financing share of the Czech party equals 25% of the total project costs. The co-financing shall include:

- Own sources of the investor/beneficiary – the funds are guaranteed by the written commitment of the local council
- Bank loan in the total amount of about 1 MEUR, for which the municipality has obtained a commitment of Česká spořitelna a.s. (documented). The funds will be provided for Stage II and III of the waste water management plan.

11.3 Additionality

The project is of public nature and is not suitable for funding from private sources due to the low financial rate of return of the funds invested. Should a major part of the co-financing be provided by a bank loan, the implemented project would not generate sources sufficient for the installation renewal after its lifetime expires.

11.4 Project Readiness and Size

The planning consent and construction permit applicable for all three stages have been acquired for the project. The project meets the required technical standards. Both feasibility study and environmental impact assessment (EIA) have been developed. The tender dossier including all exhibits will be developed and after its approval by the EC Delegation the competitive tendering can be launched.

Phare CBC 2002, Czech Republic - Poland
11.5 Sustainability
Results of the feasibility study proved that the draft project is of a sustainable nature as it meets all the European norms and standards and complies with the EU legislation in the relevant area.
Operating and maintenance costs shall be disbursed by individual facility operators and covered fully from sewage levy, providing also funds to finance any future renovation works which may be necessary at the end of the installations' life-cycle.

11.6 Compliance with State Aid Provisions
The project and the award of the Phare subsidy are in compliance with the relevant rules on state aids as defined in the European Agreement; its implementation is not going to harm the market environment or the competition rules.

11.7 Contribution to National Development Plan
The project respects short-term and medium-term priorities of the National Development Plan with the aim of balancing and improving the quality of the environment in border areas. The project is in compliance with regional priorities and measures laid down in the cross-border regional development strategy defined in the Joint Programming Document (JPD) Czech Republic – Poland for the CBC Phare programmes.
Priority: II – Environment

12. Conditionality and Sequencing
The investor is responsible for the preparation of studies and project dossiers necessary for the execution of works, and for the preparation of documents for the selection of a contractor for the works. The investor must observe its commitment of financial participation in the project and is responsible for the quality of the works executed. He must also provide for the activities the contractor is not qualified to execute.
After the completion of the project the investor shall ensure the launching of full operation of the works with a view to its use. He shall ensure regular maintenance and repairs in compliance with the international standards.

Annexes to Project Fiche
1. Logframe matrix in standard format
2. Detailed project implementation time schedule
3. Contracting and disbursement schedule by quarter for full duration of programme
4. Reference to the feasibility study; environmental impact assessment
5. Financial analyses of investment costs for stages I. – III.
<table>
<thead>
<tr>
<th>LOGFRAME PLANNING MATRIX FOR</th>
<th>Programme name and number</th>
<th>CBC 2002 Czech Republic-Poland</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project</td>
<td>Project Fiche Number: CZ2002/000-608.13.02</td>
<td>Disbursement period expires: 30/11 2005</td>
</tr>
<tr>
<td>Horní Benešov – Sewage System Construction, Stage II</td>
<td>Contracting period expires: 30/11 2004</td>
<td>Phare budget: 2,250 MEUR</td>
</tr>
</tbody>
</table>

### Overall Objective
- Improvement of water quality in border rivers and protection of watercourses crossing the state border;
- Reduced pollution of the Čížina and the Odra rivers

### Objectively Verifiable Indicators
- Decrease of pollution of Odra river
- Decrease of pollution of Čížina river 2.5 km from the river source in the profile H.Benešov - 20 m below the discharge pipeline from the WWTP two years after a completion of the project: BOD to 6.2, COD 32.5, P to 0.3. The recent pollution of Čížina river in the given profile is BOD 59.4, COD 139.6, P 0.6 (in mg/l units)

### Sources of Verification
- Regional environmental department
- Czech and Polish Environmental authorities
- Water management authority – the Odra River Authority at the Czech side

### Project Purpose
- Reduce the environmental load of soil caused by waste water in the Jeseníky Landscape Protected Area

### Objectively Verifiable Indicators
- Connection of at least 80% of the population (compared to 30% now) by 1 year after the project implementation
- Limits for discharged waste water from the WWTP after connection: BOD 11.4, COD 42.5, NL 19.5 (in mg/l units)

### Sources of Verification
- Laboratory analyses carried out 4 times a year by the WWTP operator, owner and by regulators (Public Health Authority, Czech Environment Inspectorate)
- Measurements and analyses, provided by Povodí Odry a.s. Hudební 8, Ostrava – Mariánské Hory
- Project evaluation and monitoring reports (municipality H. Benešov)

### Assumptions
- Stimulating price policy in favour of those connected to the sewage system
- Systematic monitoring of the compliance with the applicable regulations carried out by the municipality
<table>
<thead>
<tr>
<th>Results</th>
<th>Objectively Verifiable Indicators</th>
<th>Sources of Verification</th>
<th>Assumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>• A new main sewer for 2,020 equivalent units</td>
<td>• 6,800m of main sewer DN 150 to 600</td>
<td>• Project Final Evaluation Report</td>
<td>• Implementation of the works in line with the design and in the required quality</td>
</tr>
<tr>
<td>• Access lines to the system</td>
<td>• 300 access lines</td>
<td>• As-built documentation provided as part of the project acceptance procedure</td>
<td>• Connection of at least 80% of the population to the new sewage system</td>
</tr>
<tr>
<td>• Pump station</td>
<td>• 2 pump stations</td>
<td>• Turn-over and acceptance documents</td>
<td></td>
</tr>
<tr>
<td>• Resurfaced roads and pavements</td>
<td>• 6,200m of resurfaced roads and 3,950 m of resurfaced pavements</td>
<td>• Field survey</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Activities</th>
<th>Means</th>
<th>Assumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction work and delivery of equipment needed for the following implementation:</td>
<td>1 works contract</td>
<td>• Co-financing is provided and on-time</td>
</tr>
<tr>
<td>• Pipe jacking under road I/11</td>
<td></td>
<td>• Efficient co-ordination between the project funder, sub-contractors and IA</td>
</tr>
<tr>
<td>• Construction of the main sewer in the total length of 6,800 m DN 150 - 600, PVC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Installation of two pump stations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Construction of 300 access lines in the total length of 1,500 m and DN 160-200, PVC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Excavations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Blasting of bed rock</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Structural reinforcement of four buildings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Resurfacing of roads in the total length of 6,200 m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Resurfacing of pavements in the total length of 3,950 m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Relaying of water pipeline, LV and HV cables and telecom cables in the total length of about 1,800 m</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Implementation Time Chart

|------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|

T: Tendering  
C: Contracting  
I: Implementation  
D: Disbursement
Contracting and disbursement schedule

### Commitment Schedule

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Construction works</td>
<td>2,250,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2,250,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Disbursement Schedule

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Construction works</td>
<td>2,250,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>225,000</td>
<td>645,000</td>
<td>1,065,000</td>
<td>1,095,000</td>
<td>1,185,000</td>
<td>1,605,000</td>
</tr>
</tbody>
</table>
Reference to Feasibility Study

The project is aimed at the construction of a sewage system in total length of 6,800 m serving about 2,020 (plus additional 900 in the future) equivalent units and connected to the existing municipal WWTP in Horní Benešov. The high project costs are caused by hard bedrock as most of the sewage system will have to be buried in it. There is also a big difference in levels and the structure of several buildings will have to be reinforced. The proposed project is driven by the need to deal with the waste water management to improve the quality of surface water and enhance the protection of ground water in the border region.

Market Analysis
The target group is about 2,020 equivalent units at Horní Benešov. The availability of a sewage system in the entire town is in line with the municipal development plan, the first priority of which is to create new job opportunities in the SME sector and tourism. Reducing the operating and maintenance costs of the existing obsolete sewage system will result in more favourable and affordable fees charged to the customers for the sewage treatment. The survey carried out demonstrated that the majority of households is interested in access to the sewage system at the prices foreseen for the sewage management. The results of the analysis demonstrated the project sustainability.

Organisation of Operations
After the project implementation the existing WWTP and the sewage system will be owned by the municipality of Horní Benešov, the project owner. The operator and service provider responsible for sewage and waste water treatment will be Služby města Horní Benešov, s.r.o., which is a 100% municipal company. The same company manages municipal flats, provides small maintenance work, road and street cleaning and park maintenance. The operating costs will be fully covered by the revenues from the fees paid for sewage treatment. The price for sewage treatment is guaranteed by the municipality and the minimum price increase in the future is the basis for the project sustainability.

Results of Financial Analysis
The result of the financial analysis based on the period of 30 years is a negative value of the internal rate of return $\text{FRR} < 0\%$. The analysis demonstrated that the projected fees for the sewage treatment will generate sufficient sources to cover operating costs of the project but will not allow to create sufficient funds for the project renewal after its life expires.

Results of the Economic Analysis
Results of an economic analyses are reflected in internal rate of return which amounts $\text{ERR} = 6.47\%$.

The economic analyses is mainly based on calculations of savings for local inhabitants resulting from lower prices which will be charged for the new sewage management in comparison to the present costly and inefficient technology. In addition to that a creation of one permanent job further improves socio-economic impacts of the project.

After the project implementation the efficiency of the waste water treatment will comply with the EU standards (reductions of \text{BOD$_3$} by 96.3 \% and NL by 85.7\%). This will have a positive effect on ground water pollution in the Jesenky Landscape Protected Area, and will decrease the contamination of water courses flowing to Poland. The project is in line with the national and regional medium-term strategies to reduce environmental loads and risks contributing thus to sustainable development. (sustainable development of the area).

The results of the study has proved feasibility of the project without any significant risks that could threaten its implementation.

Environmental Impact Assessment
The EIA was carried out in compliance with Directive 97/11/EC of 3$^{\text{rd}}$ March 1997. It includes both environmental impacts during the project construction and operation. The assessment results have proved that when the technological discipline is adhered to both during the implementation and the operation proper the project will clearly contribute to the environmental improvement of the border area. Based on the assessment performed the project was recommended for implementation.
Financial Analysis of Investment Costs, Stages I - III.

Stage I: Horní Benešov - WWTP and Sewage System, Stage I
Implementation: 1999 - 2001

<table>
<thead>
<tr>
<th>Investment costs</th>
<th>CZK</th>
<th>EUR</th>
</tr>
</thead>
<tbody>
<tr>
<td>WWTP</td>
<td>16 000 000</td>
<td>478 112</td>
</tr>
<tr>
<td>Sewage system (3,400 m)</td>
<td>24 286 000</td>
<td>725 713</td>
</tr>
<tr>
<td>Of which excavations</td>
<td>12 580 000</td>
<td>375 915</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>40 286 000</strong></td>
<td><strong>1 203 825</strong></td>
</tr>
</tbody>
</table>

The average costs of 1 m of the main sewer: CZK 7,143.00 EUR 213.45
Two thirds of the excavation work for the main sewer will be performed in an open area with no access lines.

Stage II: Horní Benešov - Sewage System Construction, Stage II
Expected implementation: 2004 - 2005

<table>
<thead>
<tr>
<th>Investment costs</th>
<th>CZK</th>
<th>EUR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe jacking under road I/11</td>
<td>280,000</td>
<td>8,367</td>
</tr>
<tr>
<td>Main sewer (6,800 m)</td>
<td>23,600,000</td>
<td>705,214</td>
</tr>
<tr>
<td>2 pump stations</td>
<td>180,000</td>
<td>5,379</td>
</tr>
<tr>
<td>300 sewage access lines (about 1,500 m)</td>
<td>6,000,000</td>
<td>179,292</td>
</tr>
<tr>
<td>Excavations</td>
<td>46,391,000</td>
<td>1,386,254</td>
</tr>
<tr>
<td>Blasting of hard bed-rock</td>
<td>1,400,000</td>
<td>41,835</td>
</tr>
<tr>
<td>Structural reinforcement of four buildings</td>
<td>300,000</td>
<td>8,965</td>
</tr>
<tr>
<td>Road re-surfacing (about 6,200 m)</td>
<td>12,400,000</td>
<td>370,536</td>
</tr>
<tr>
<td>Pavement re-surfacing (about 3,900 m)</td>
<td>6,800,000</td>
<td>203,197</td>
</tr>
<tr>
<td>Relaying of other services (about 1,800 m)</td>
<td>3,044,000</td>
<td>90,961</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100,395,000</strong></td>
<td><strong>3,000,000</strong></td>
</tr>
</tbody>
</table>

The average cost of 1 m of the sewage system: CZK 12,096.00 EUR 361.45
The high cost of the excavations is caused by the following facts:
- The difference between the highest and lowest point in the system is about 90 m and therefore the main sewer must be provided with shafts and buried 1.8 to 4 meters deep.
- The hardness of the rock corresponds to class 4 to 6 including a hard bed-rock
- 2/3 of the sewage system are located in the old town centre where the trench will have to be sheeted due to the nearby buildings
- 90% of the sewage system will be laid under the existing hard surfaced roads and pavements
- Under the roads all other services such as water, gas, HV and LV power cables are laid and this infrastructure is closer to the surface than the intended sewage system. Therefore some excavations will have to be done manually.

Stage III: Horní Benešov – Sewage System Construction, Stage III
Expected implementation: 2007 - 2010

<table>
<thead>
<tr>
<th>Investment costs</th>
<th>CZK</th>
<th>EUR</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 pump stations</td>
<td>300,000</td>
<td>8,965</td>
</tr>
<tr>
<td>Main sewer (2,300 m)</td>
<td>24,545,000</td>
<td>733,453</td>
</tr>
<tr>
<td>Access lines (610 m)</td>
<td>5,000,300</td>
<td>149,419</td>
</tr>
<tr>
<td>Excavations</td>
<td>15,154,700</td>
<td>452,852</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>45,000,000</strong></td>
<td><strong>1,344,689</strong></td>
</tr>
</tbody>
</table>

The average cost of 1 m of the sewage system: CZK 15,464 EUR 462.09