

# Welcome to Zurich Water Supply



Clean and safe drinking water for everyone



Stadt Zürich  
Wasserversorgung

natürlich **züri**  
wasser

# Supply Area

## City of Zurich

- 400,000 inhabitants

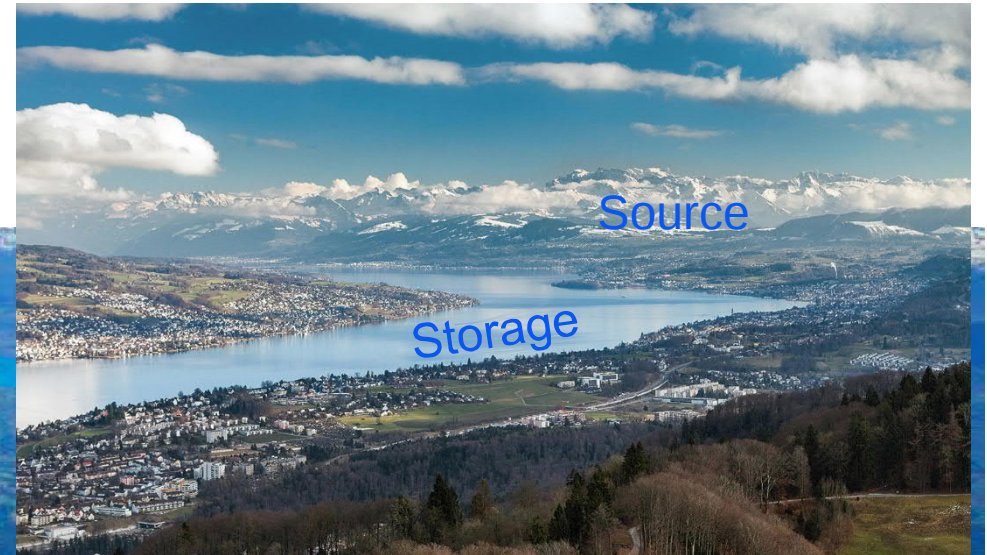
## Plus 67 communities

- 510,000 inhabitants
- 660 km<sup>2</sup> supply area



# Origin of the water

70 % Lakewater  
15 % Springwater  
15 % Groundwater

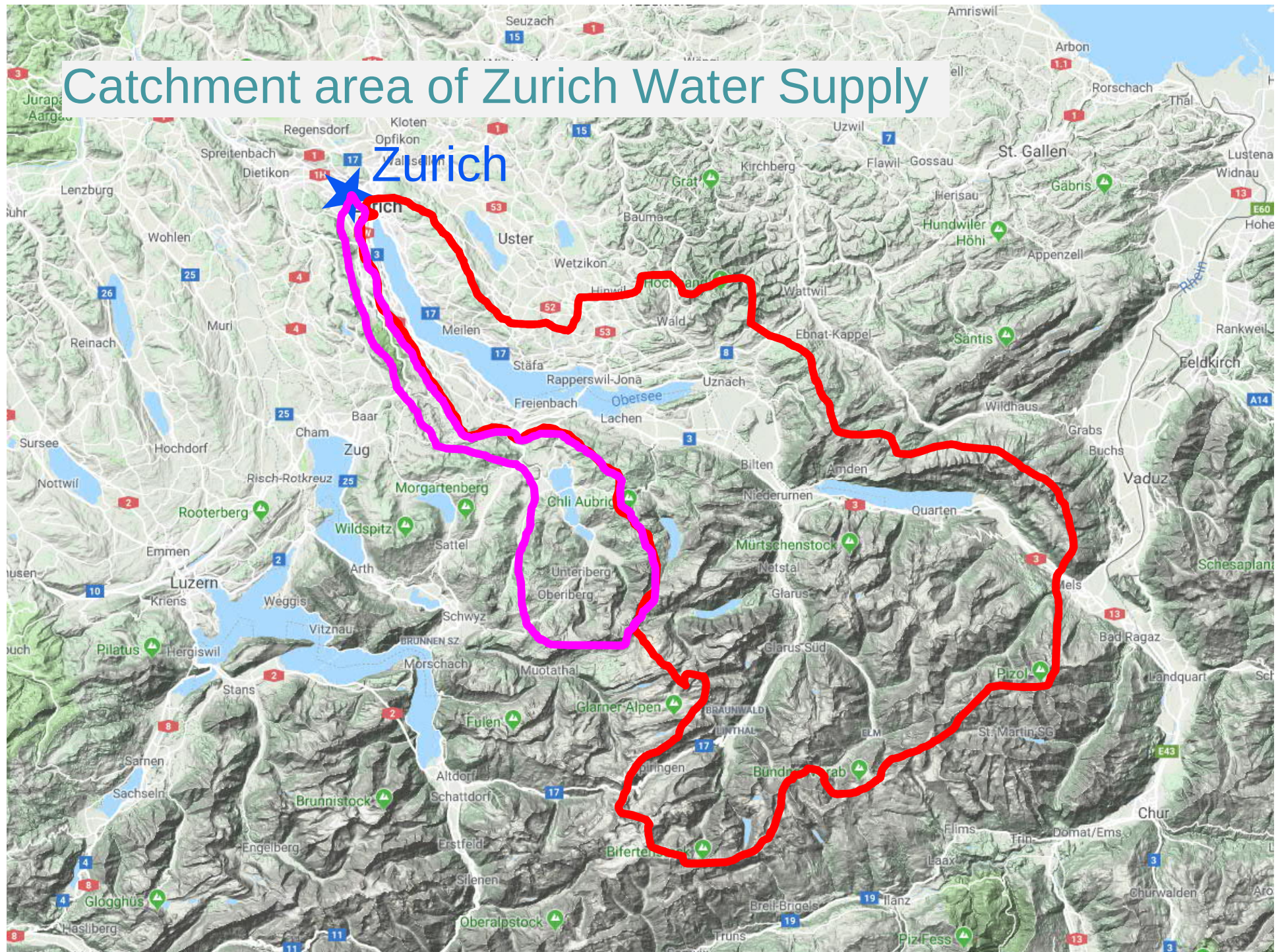


Lakewatertreatmentplant Lengg

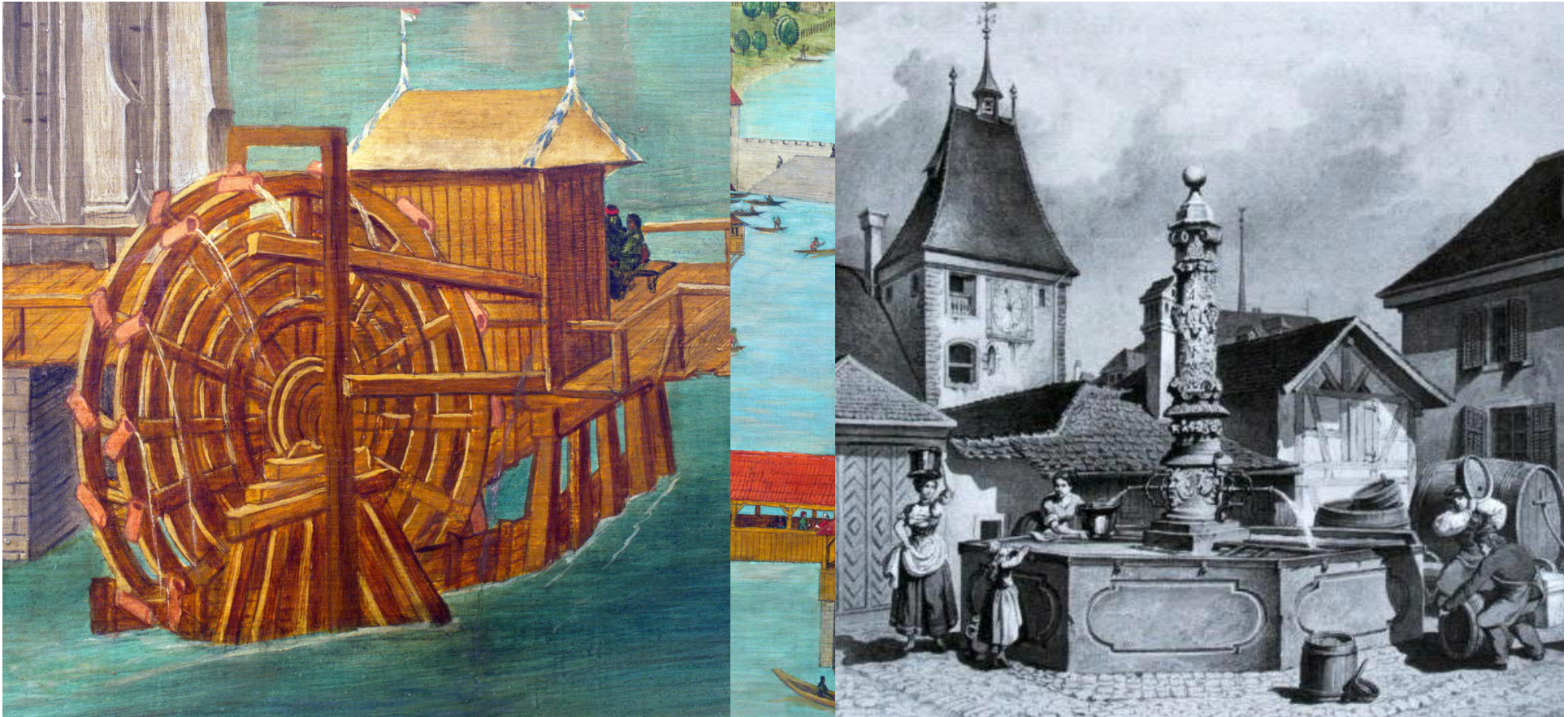
Lakewatertreatmentplant Moos

Groundwaterplant  
Hardhof

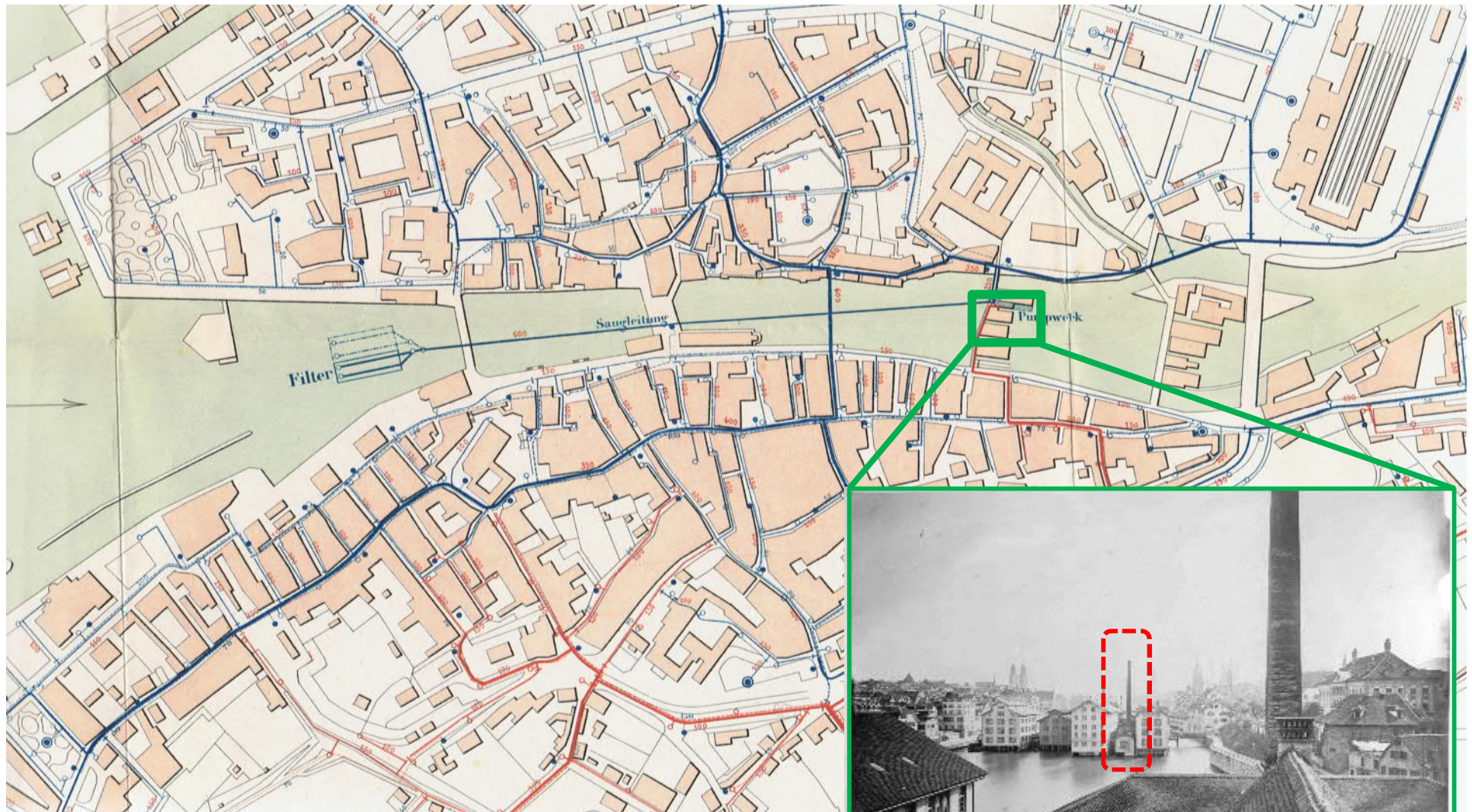
# Catchment area of Zurich Water Supply



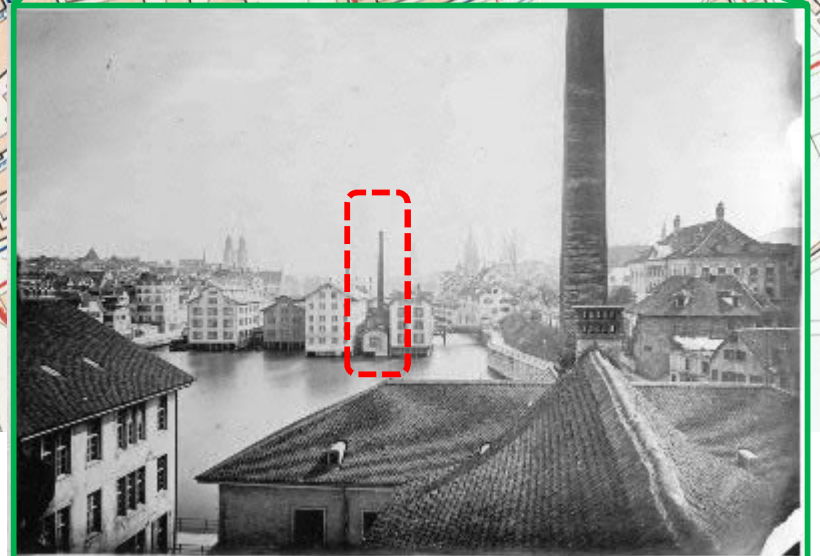
# Water supply before 1868



# First water distribution 1868



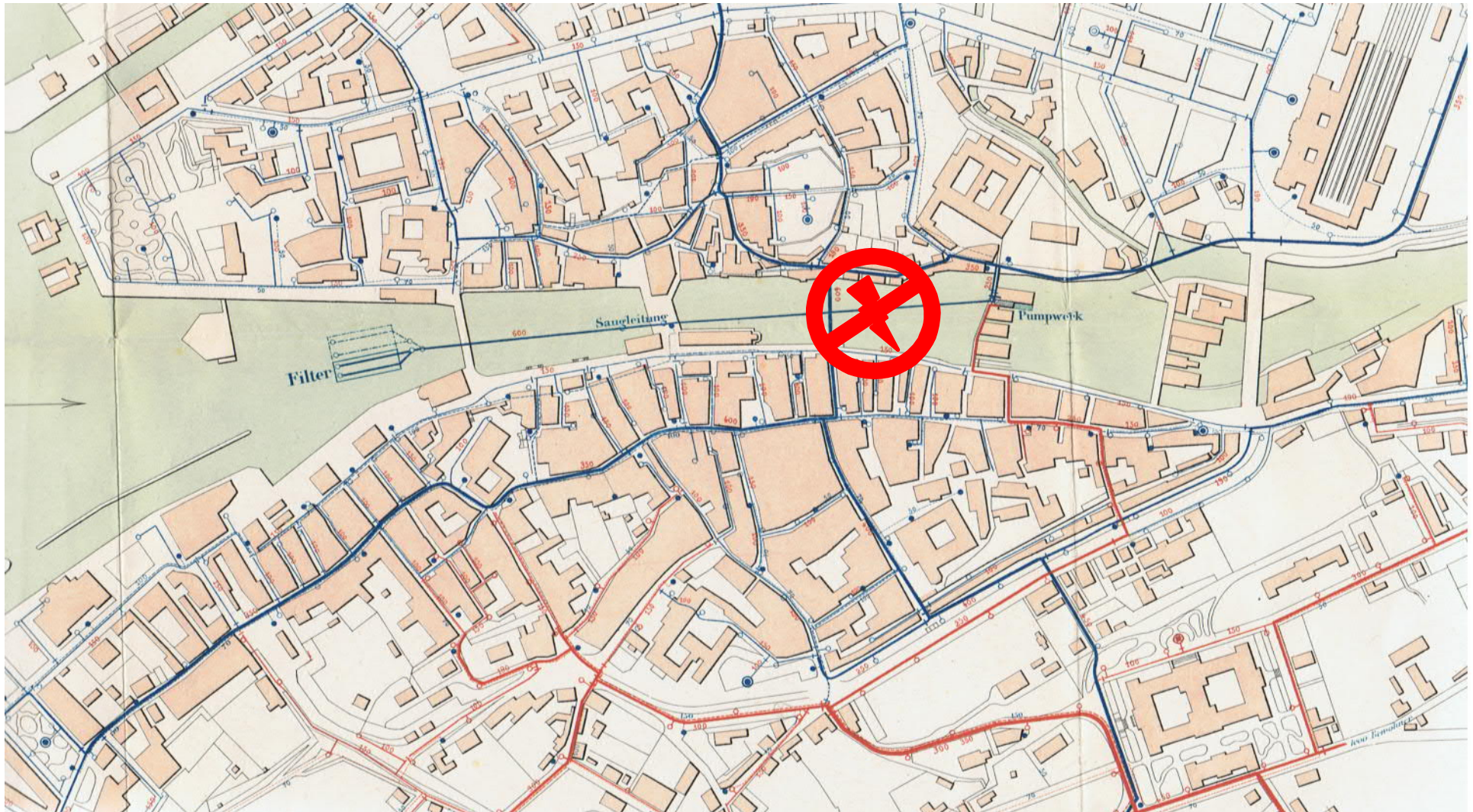
Stadt Zürich  
Wasserversorgung



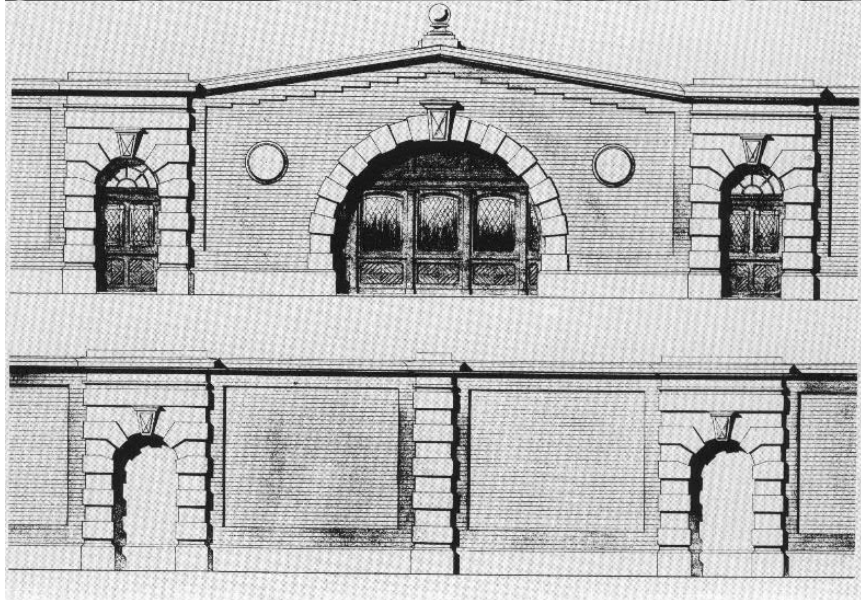
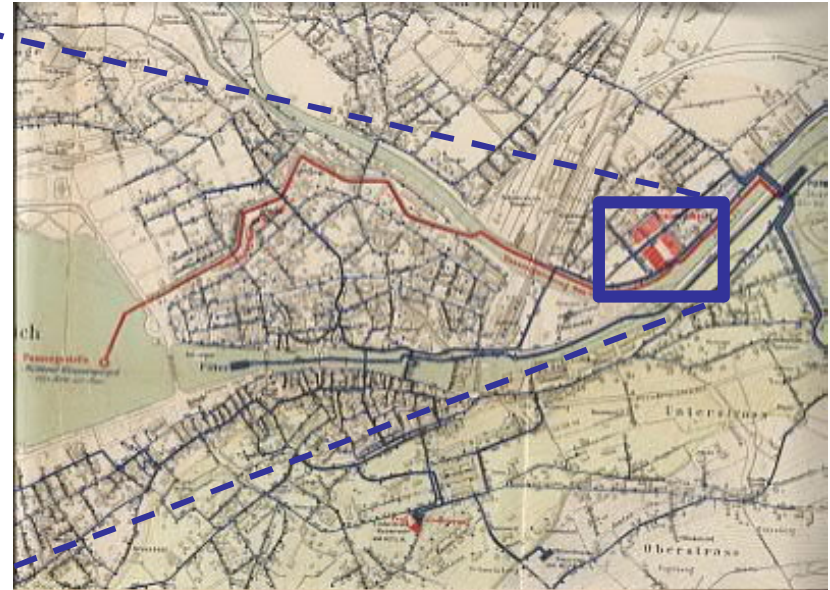
# Typhus epidemia 1884



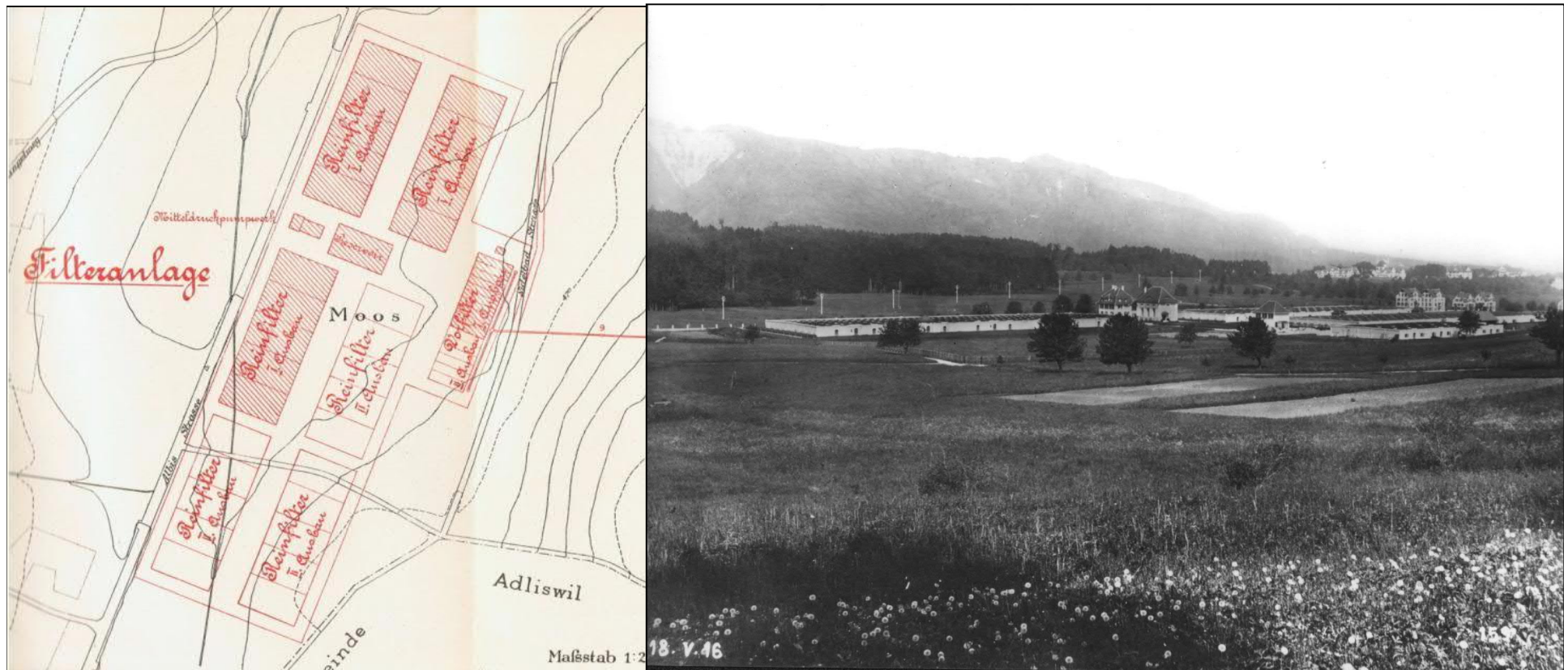
# Insufficient maintenance



# First Lakewaterplant at Silquai 1885



# 1911: Decision to build Lakewater treatment plant Moos





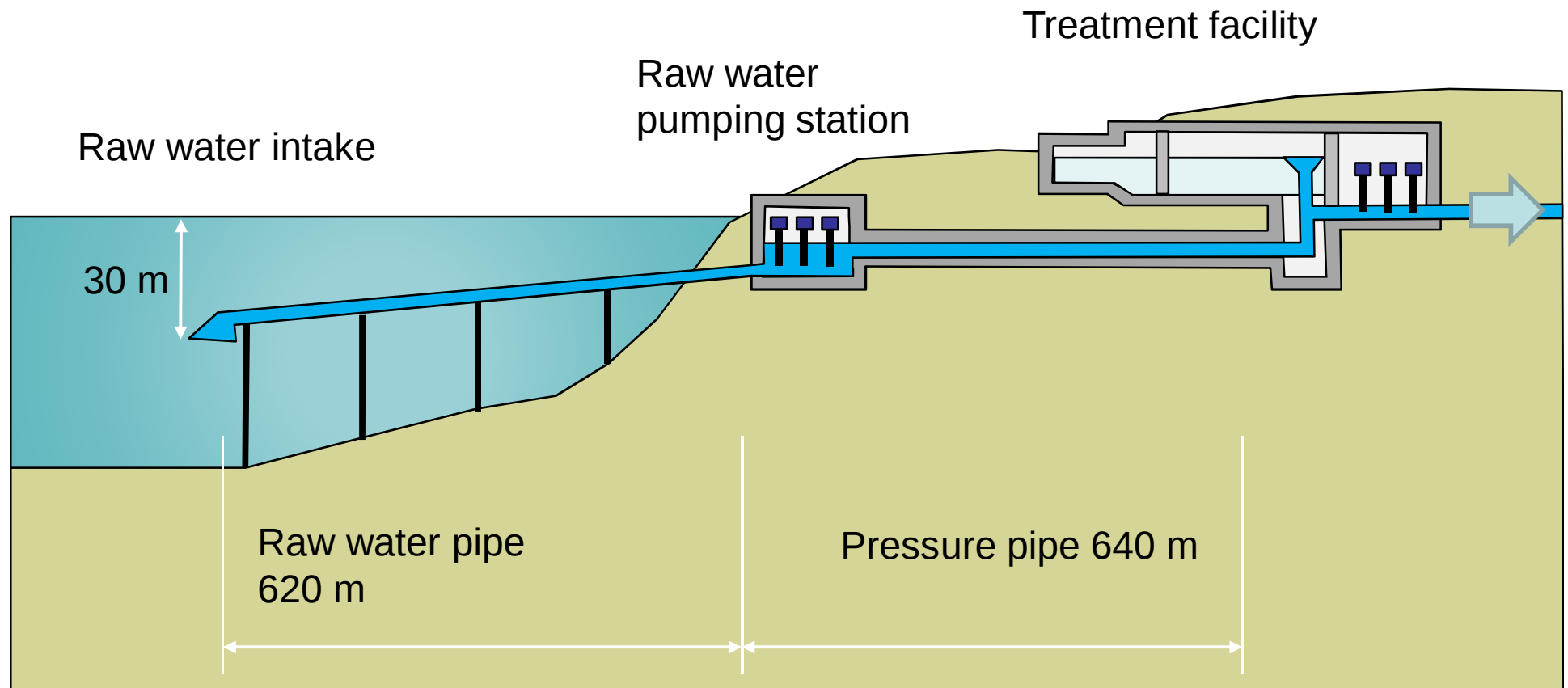
Built: 1914, Capacity: 100'000\* m<sup>3</sup>/day \*including 20'000 Springwater)

# Lakewater treatment plant Lengg



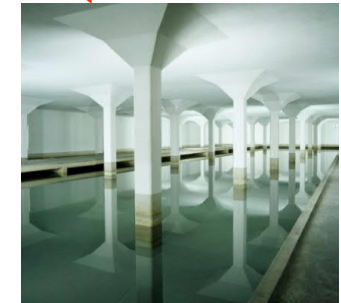
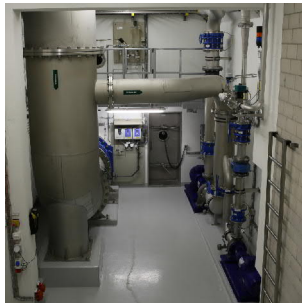
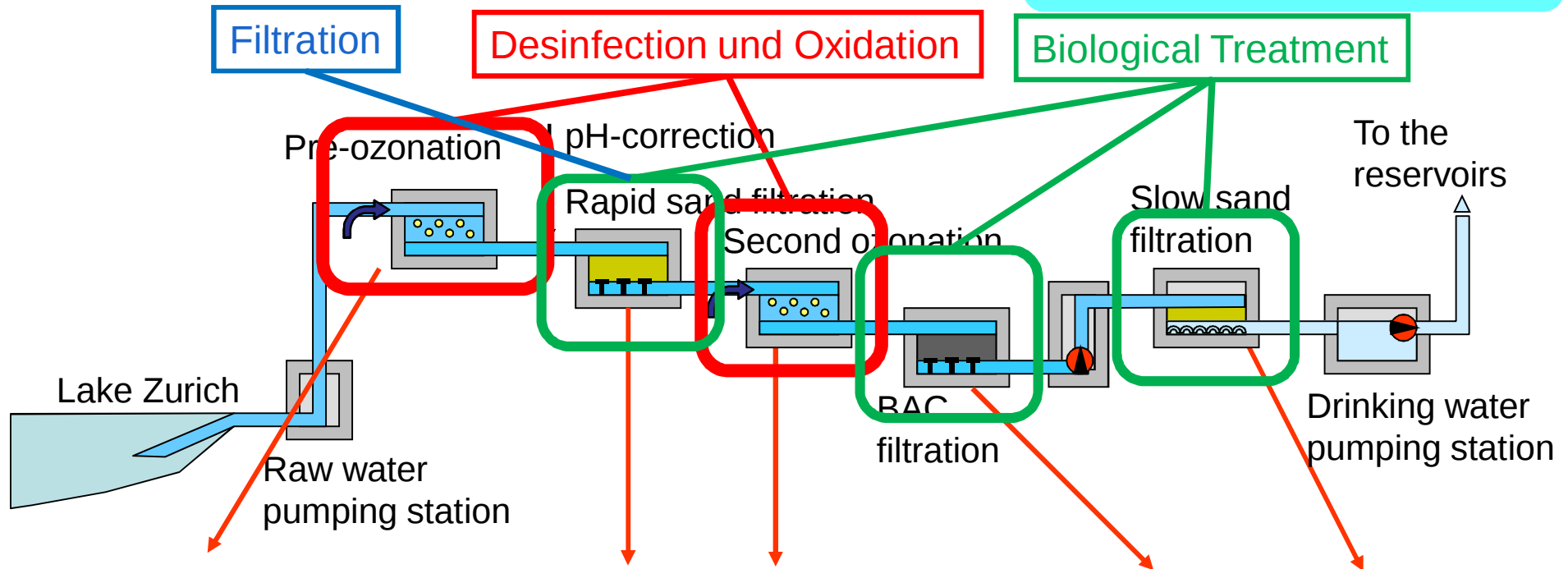
Built: 1960 Expanded:1975, Capacity: 250'000 m<sup>3</sup>/day

# Lakewater treatment



# Drinking water treatment (Lengg)

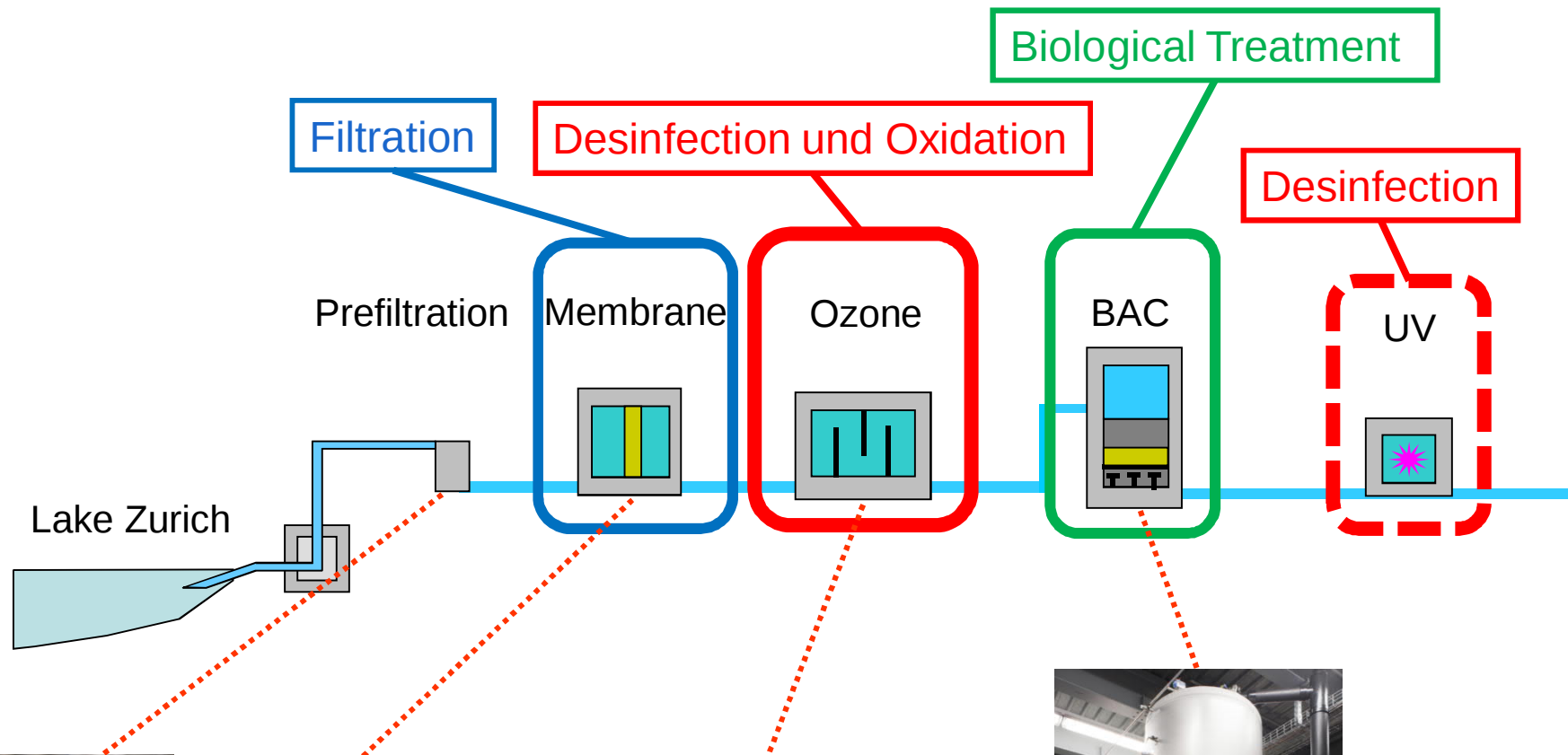
Bactereological stable water  
without chlorination



# Maintenance of the Slow Sand Filter



# Alternative Treatment train



# New lakewater treatment plant Moos



# New lakewater treatment plant Moos



# Origin of the water



# Springs around Zurich

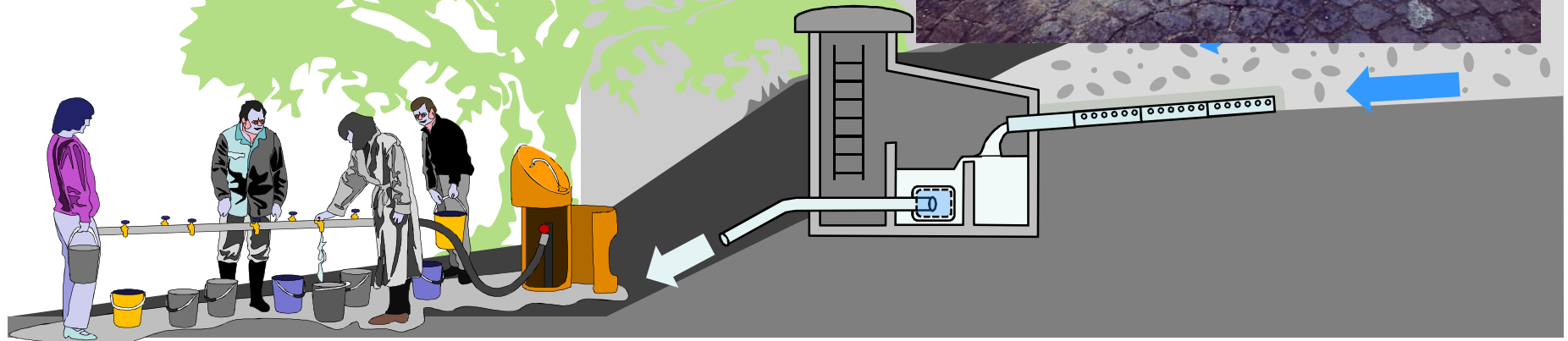


160 Springs in Zurich

120 Springs in Sihl- and Lorzetal

# Spring water distribution

The 85 emergency water fountains are included in the 400 spring water fountains and are connected to the 150 km spring water distribution system.

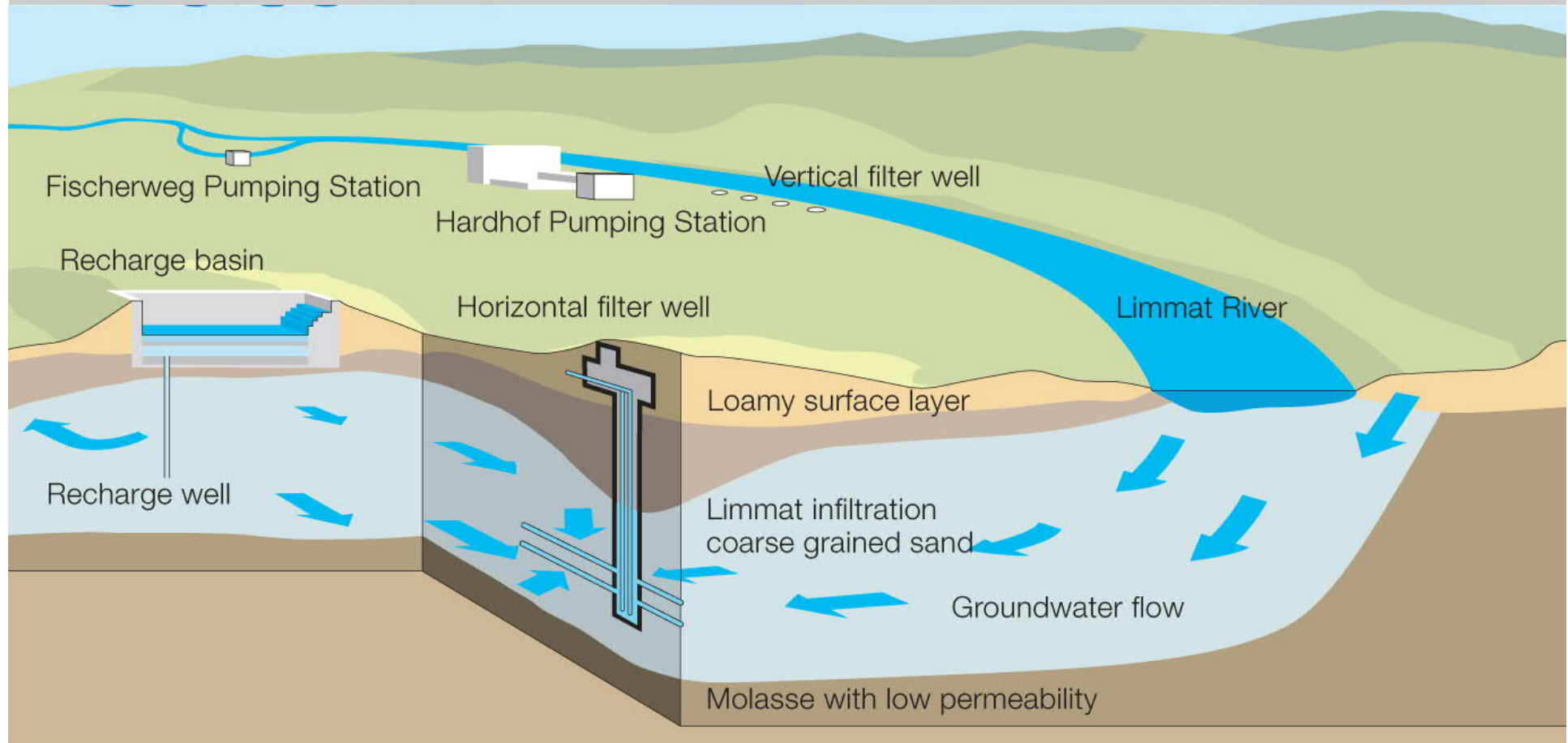


# Origin of the water



# Groundwaterplant Hardhof

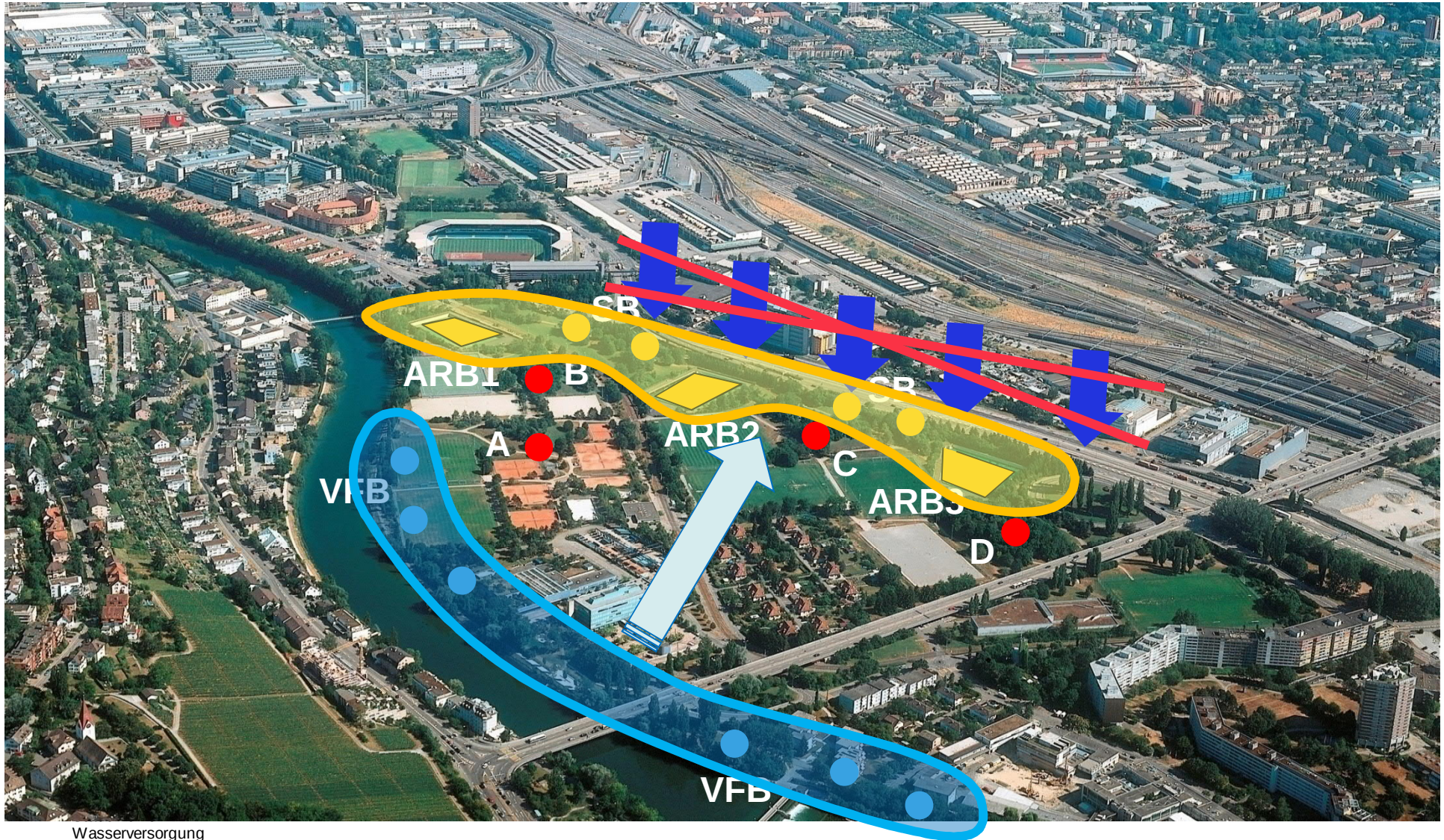
Built: 1934/1973, Theoretical capacity: 150'000 m<sup>3</sup>/day



# Groundwater plant Hardhof

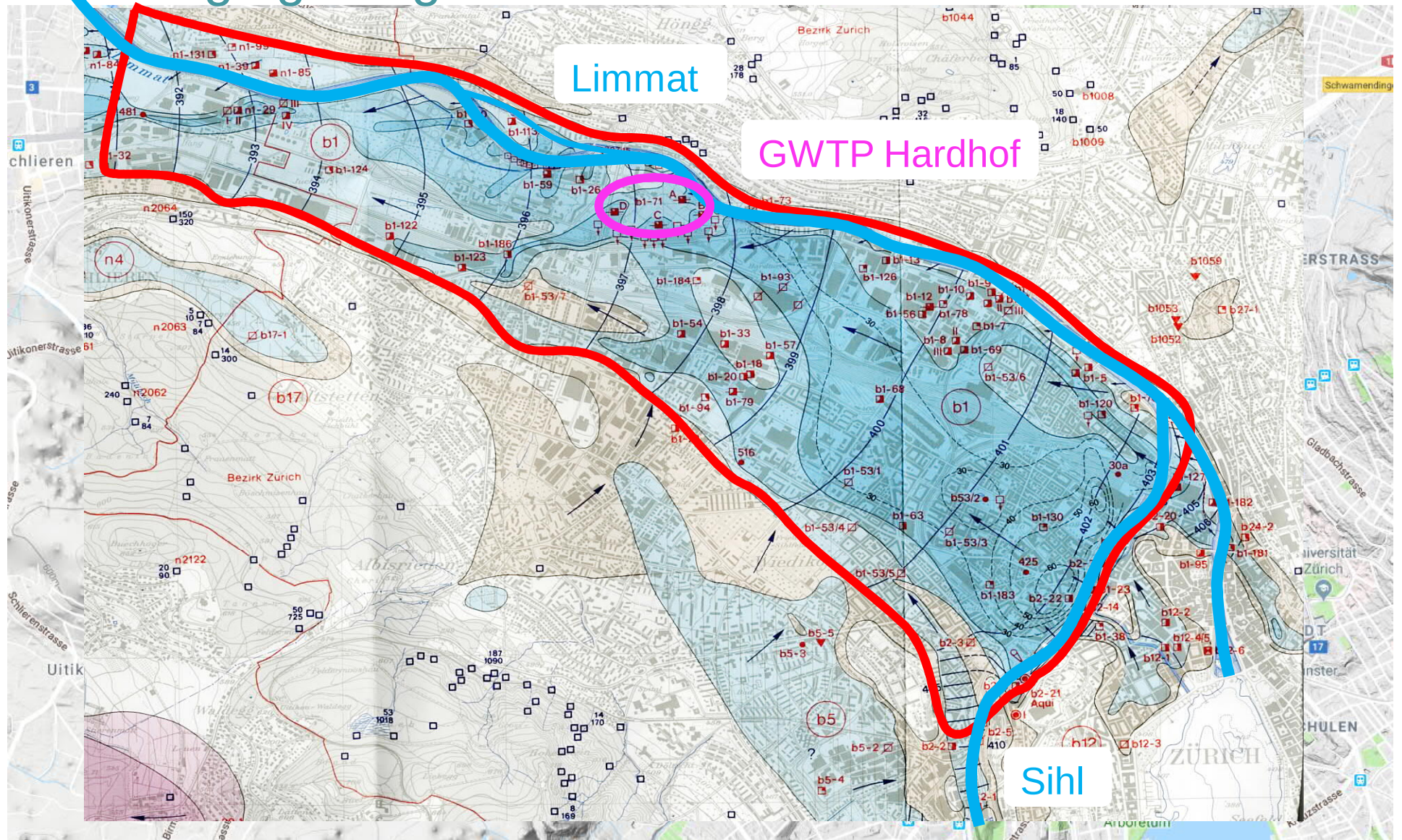


# Technical implementation

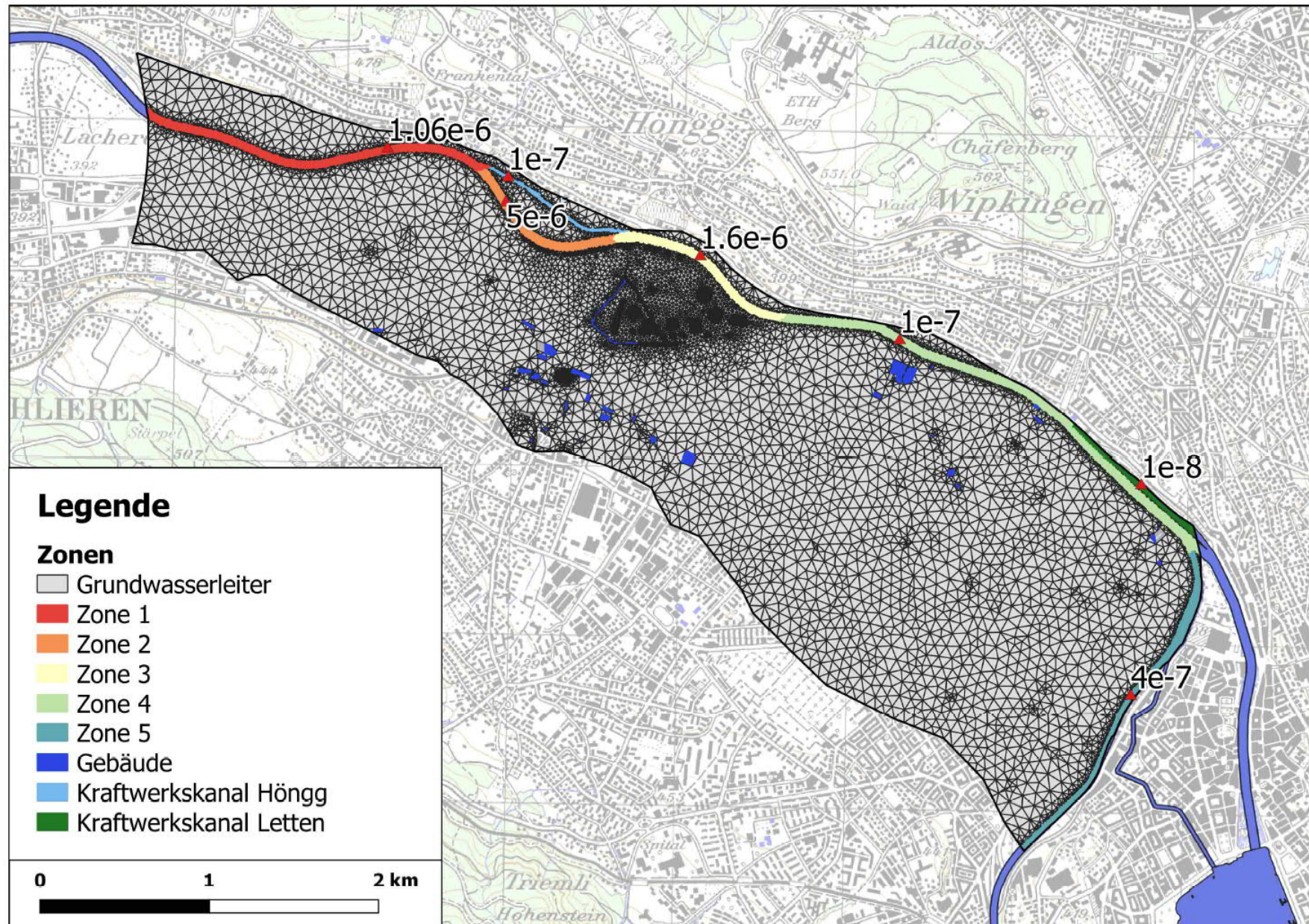


Wasserversorgung

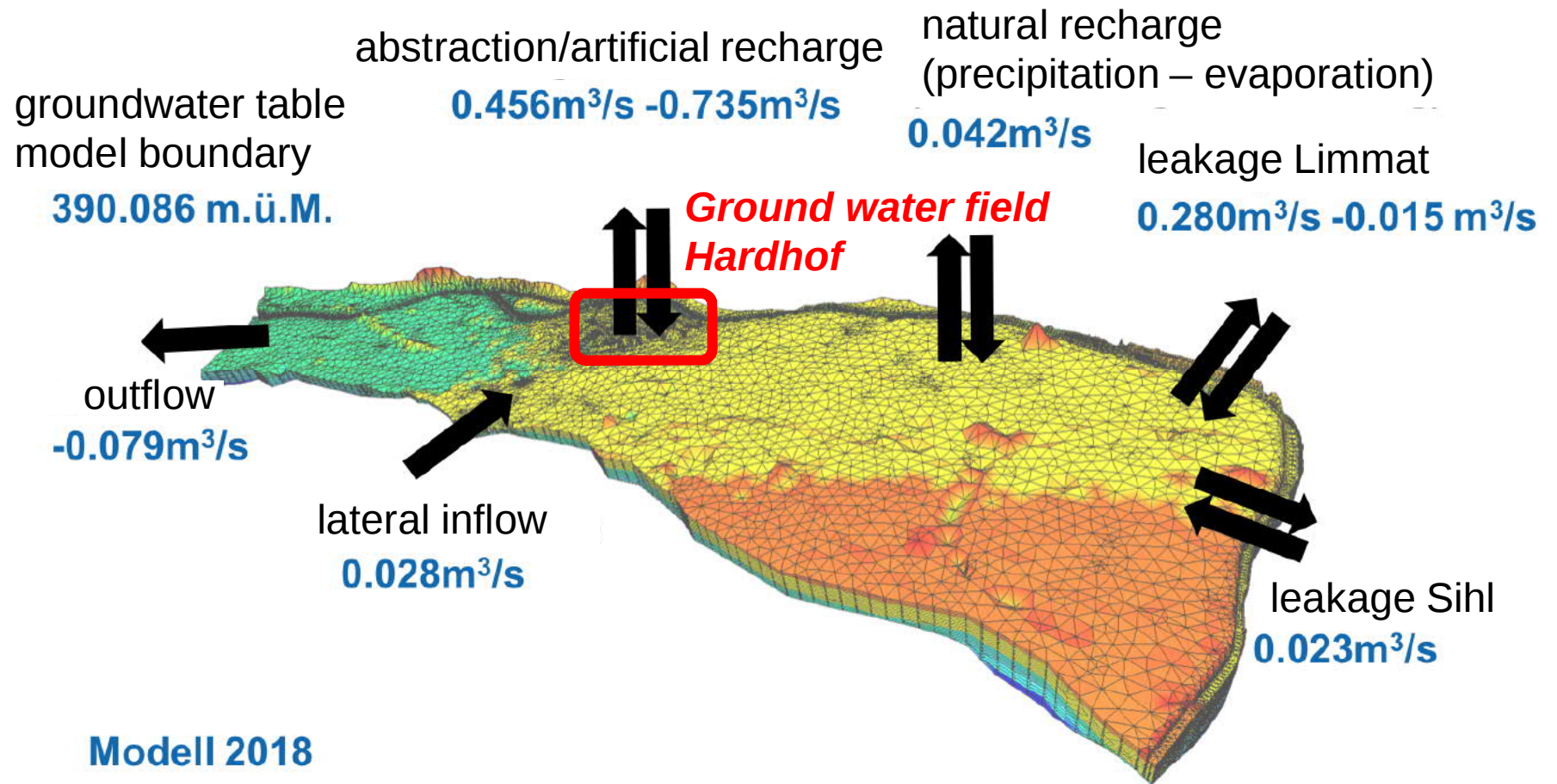
# Managing the ground water field



# Real time ground water model

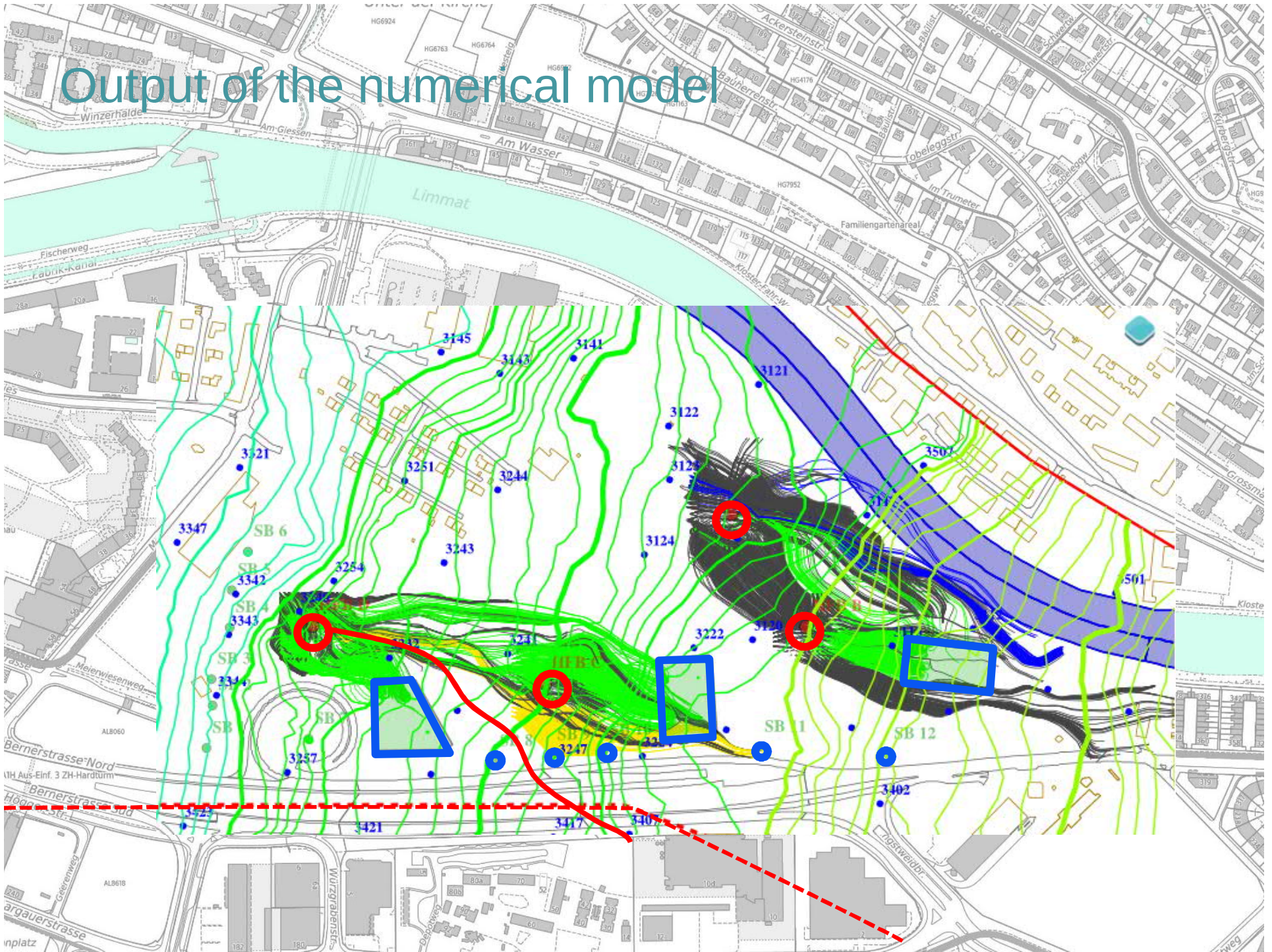


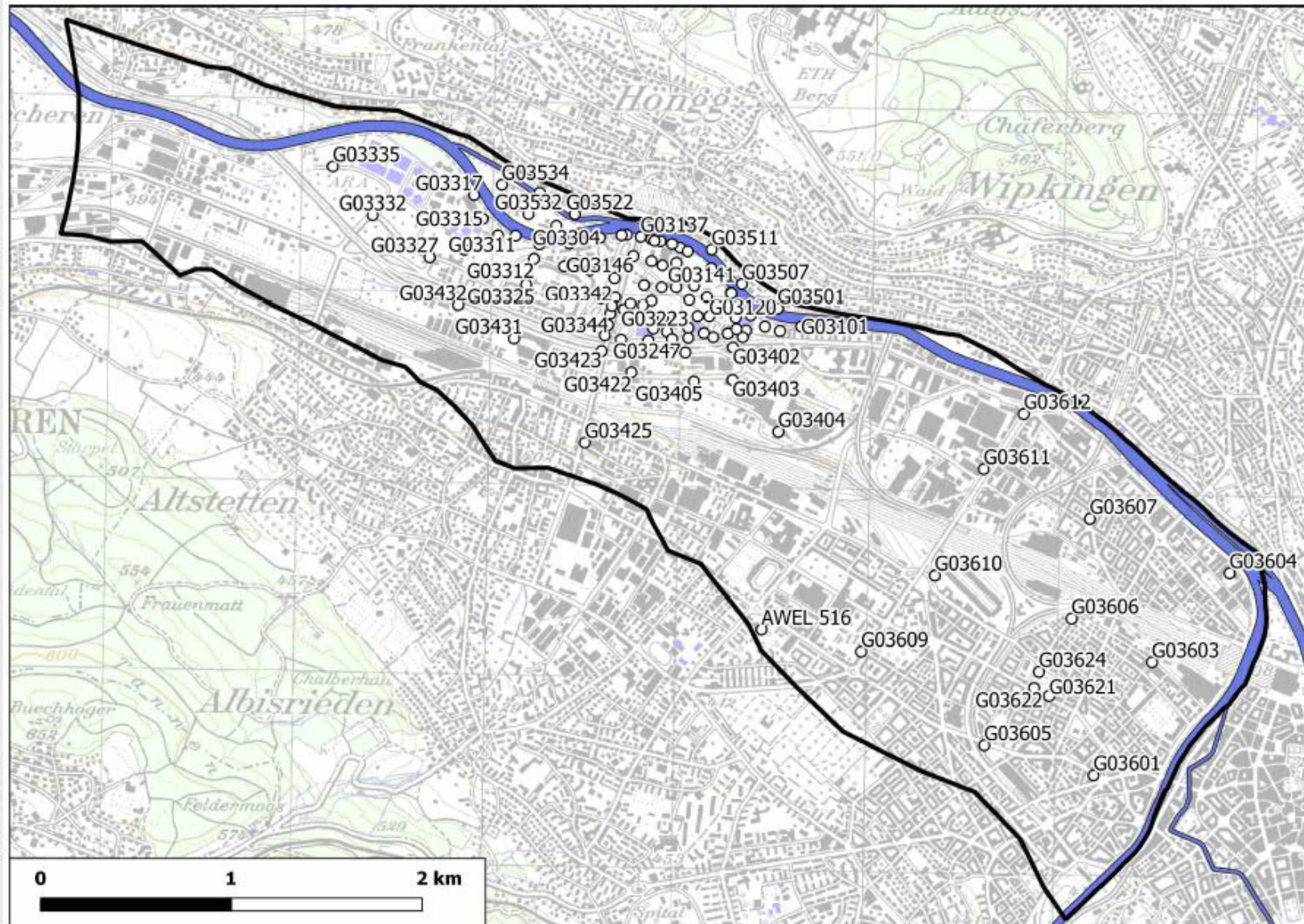
# Boundary conditions of the ground water model



# Output of the numerical model

The map displays the output of a numerical model, likely a flood simulation, overlaid on a topographic and urban map. The river Limmat is visible at the top. The simulation area is highlighted in green, showing the extent of the modeled event. Blue dots represent specific data points or stations, many labeled with numbers (e.g., 3145, 3143, 3141, 3121, 3122, 3124, 3120, 3122, 3222, 3402, 3407, 3417, 3421, 3257, 3247, 3243, 3244, 3251, 3347, 3342, 3343, 3344, 3254, 3241, 3242, 3243, 3244, 3245, 3246, 3247, 3248, 3249, 3250, 3251, 3252, 3253, 3254, 3255, 3256, 3257, 3258, 3259, 3260, 3261, 3262, 3263, 3264, 3265, 3266, 3267, 3268, 3269, 3270, 3271, 3272, 3273, 3274, 3275, 3276, 3277, 3278, 3279, 3280, 3281, 3282, 3283, 3284, 3285, 3286, 3287, 3288, 3289, 3290, 3291, 3292, 3293, 3294, 3295, 3296, 3297, 3298, 3299, 3300, 3301, 3302, 3303, 3304, 3305, 3306, 3307, 3308, 3309, 3310, 3311, 3312, 3313, 3314, 3315, 3316, 3317, 3318, 3319, 3320, 3321, 3322, 3323, 3324, 3325, 3326, 3327, 3328, 3329, 3330, 3331, 3332, 3333, 3334, 3335, 3336, 3337, 3338, 3339, 3340, 3341, 3342, 3343, 3344, 3345, 3346, 3347, 3348, 3349, 3350, 3351, 3352, 3353, 3354, 3355, 3356, 3357, 3358, 3359, 3360, 3361, 3362, 3363, 3364, 3365, 3366, 3367, 3368, 3369, 3370, 3371, 3372, 3373, 3374, 3375, 3376, 3377, 3378, 3379, 3380, 3381, 3382, 3383, 3384, 3385, 3386, 3387, 3388, 3389, 3390, 3391, 3392, 3393, 3394, 3395, 3396, 3397, 3398, 3399, 3400, 3401, 3402, 3403, 3404, 3405, 3406, 3407, 3408, 3409, 3410, 3411, 3412, 3413, 3414, 3415, 3416, 3417, 3418, 3419, 3420, 3421, 3422, 3423, 3424, 3425, 3426, 3427, 3428, 3429, 3430, 3431, 3432, 3433, 3434, 3435, 3436, 3437, 3438, 3439, 3440, 3441, 3442, 3443, 3444, 3445, 3446, 3447, 3448, 3449, 3450, 3451, 3452, 3453, 3454, 3455, 3456, 3457, 3458, 3459, 3460, 3461, 3462, 3463, 3464, 3465, 3466, 3467, 3468, 3469, 3470, 3471, 3472, 3473, 3474, 3475, 3476, 3477, 3478, 3479, 3480, 3481, 3482, 3483, 3484, 3485, 3486, 3487, 3488, 3489, 3490, 3491, 3492, 3493, 3494, 3495, 3496, 3497, 3498, 3499, 3500). A red dashed line and a solid red line are overlaid on the map. The map also shows various street names and building footprints.

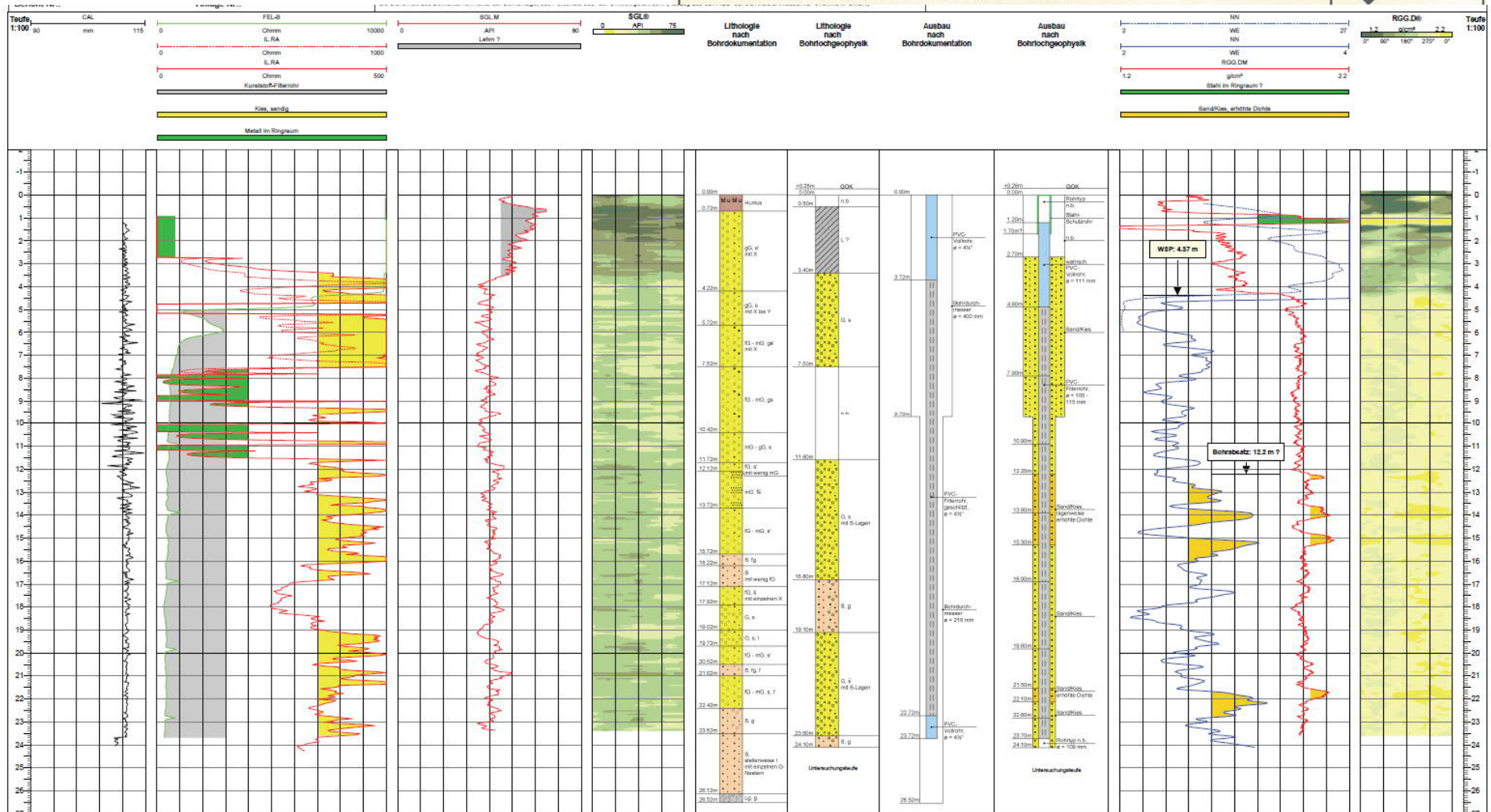


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# Validation of the ground water model

## 2. Soil conditions

CKW - Verunreinigung im Grundwasser  
Schutzzone Hardhof, Zürich



Stadt Zürich  
Wasserversorgung

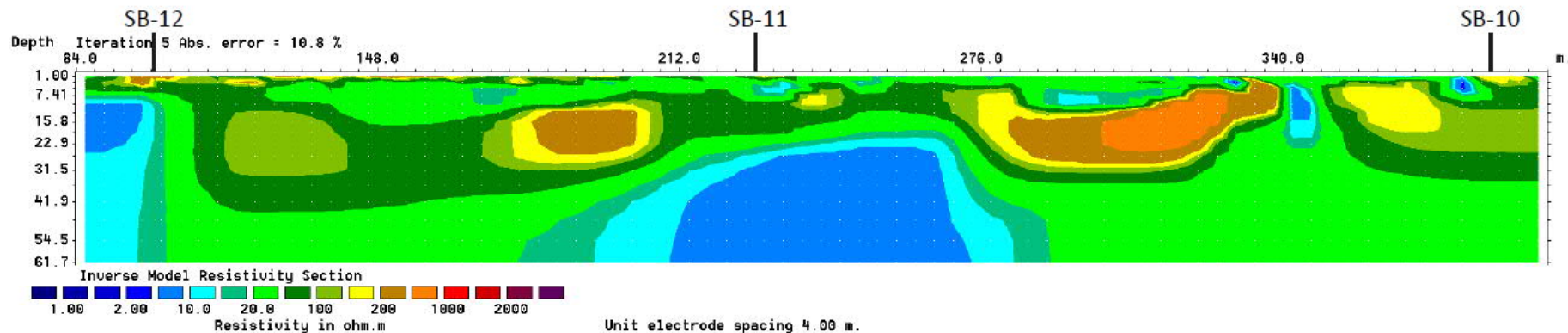
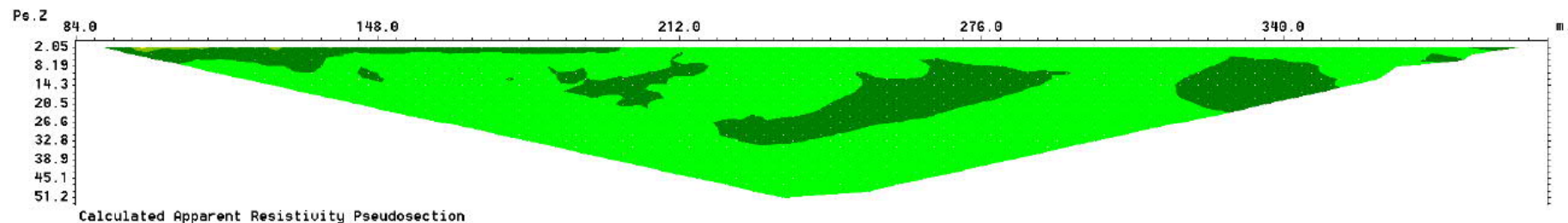
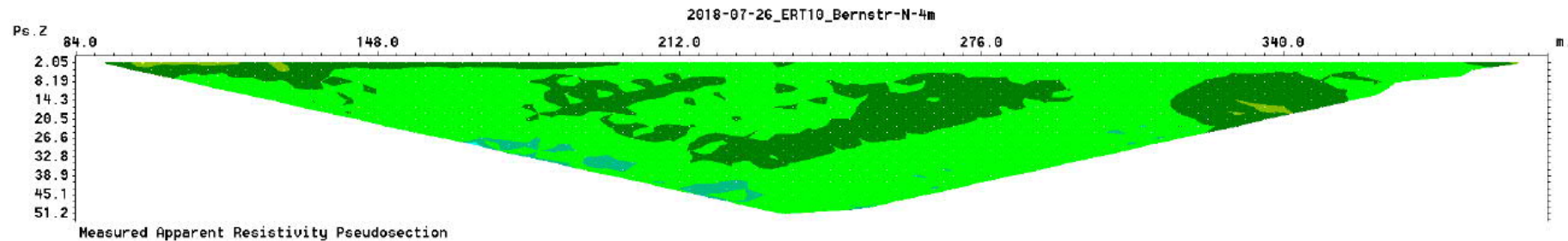
Legende:  
 gestörte Bodenprobe mit Angabe des CKW-Gehaltes  
 punktförmiger Pumpversuch mit Angabe des CKW-Gehaltes  
 schichtweiser Pumpversuch mit Angabe des CKW-Gehaltes

# Validation of the ground water model

## 3. Hydrogeophysical conditions (ERT measurements)

**ERT-10** (Wenner-Array mit 4 Kabeln und 99 Sonden, spacing 4 m, Auslage 4 bis 396 m, Skala 1 - 5000 Ohm.m; **Sonden 0-84 m wegen Datenqualität eliminiert!**)

Messort: Hardhofareal/Südgrenze, Bernerstrasse Nord, ERT-Profil 1 m nördl. des Gehwegs (Beginn ERT10-21: 680'295.11 / 249'774.35 / 400.60; Ende ERT10-99: 679'986.62 / 249'774.90 / 399.45); Schluckbrunnen 12 (SB-12; 680'279.07 / 249'780.25) liegt bei ca. 100 m. Schluckbrunnen 11 (SB-11; 680'151.09 / 249'787.25) liegt bei ca. 228 m. Schluckbrunnen 10 (SB-10; 679'998.05 / 249'788.94) liegt bei ca. 384 m.  
**ACHTUNG: 4.0 m ist OST-Ende, 396.0 m ist WEST-Ende des ERT-Profiles!**



OST

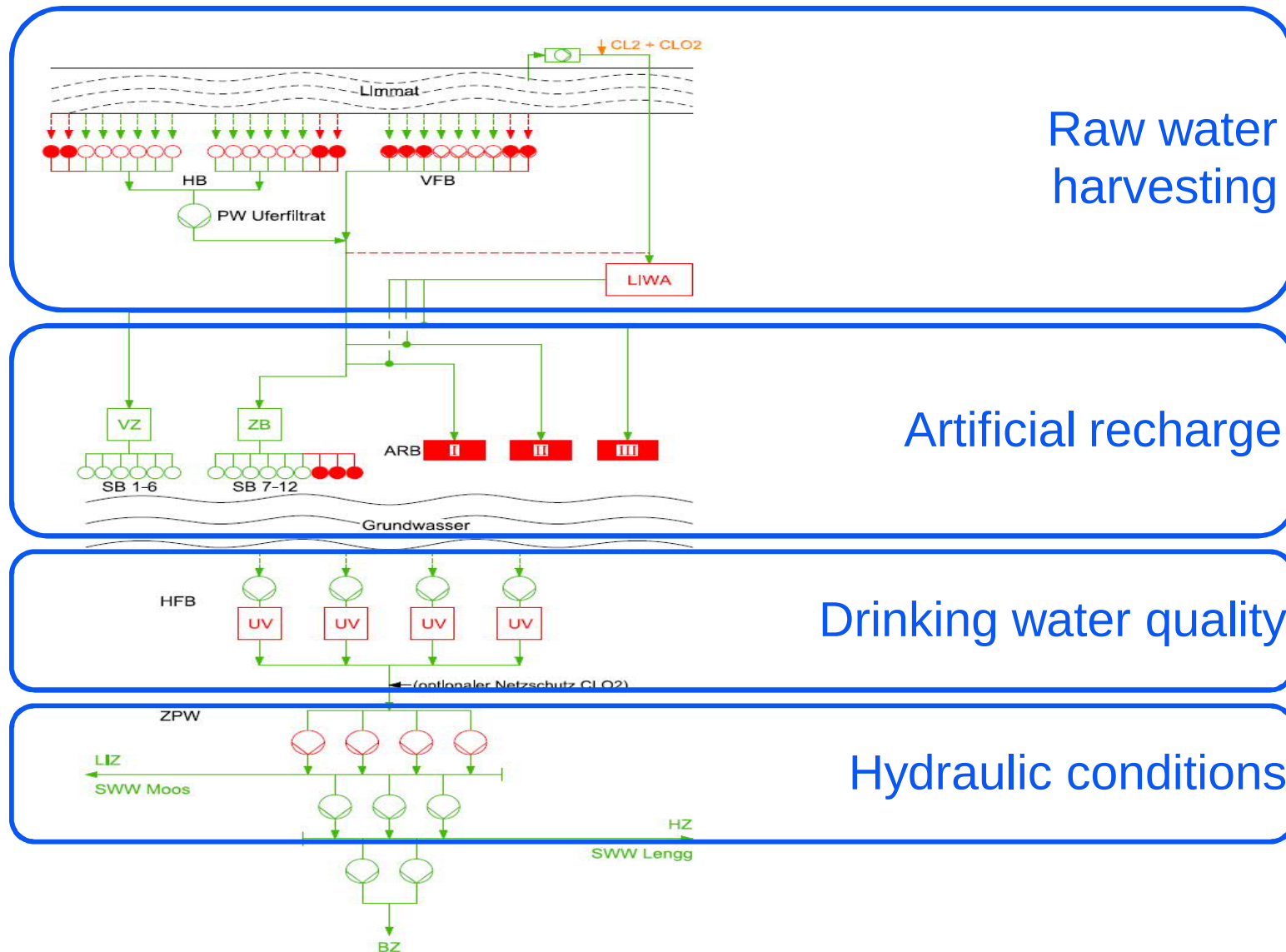
WEST

# Validation of the ground water model

## 4. Sampling campaigns



# Make urban ground water harvesting future-proof



# Urban ground water ..... future-proof?



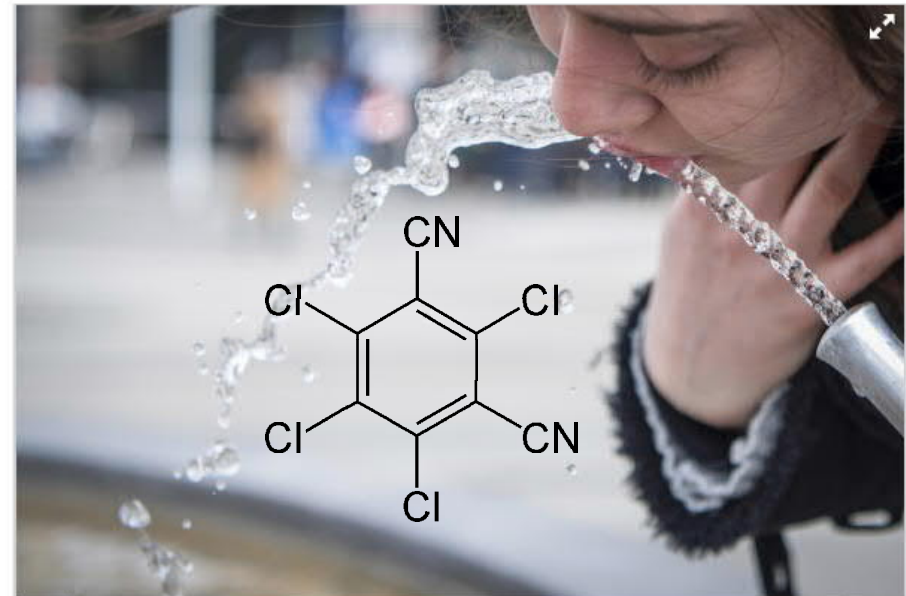
Wasserversorgung

Bericht des Bundes

15. August 2019 11:38; Akt: 15.08.2019 12:30

## Forscher finden giftige Stoffe im Grundwasser

*Der Bund schlägt Alarm: Einwandfreies Trinkwasser sei nicht mehr selbstverständlich. Im Grundwasser wurden potenziell krebserregende Stoffe gefunden.*



1/9

Das Grundwasser in der Schweiz steht unter Druck: Zu diesem Schluss kommt ein neuer Bericht des Bundesamtes für Umwelt (Bafu) zur Wasserqualität.



Bild: Keystone/Melanie Duchene

# Water distribution

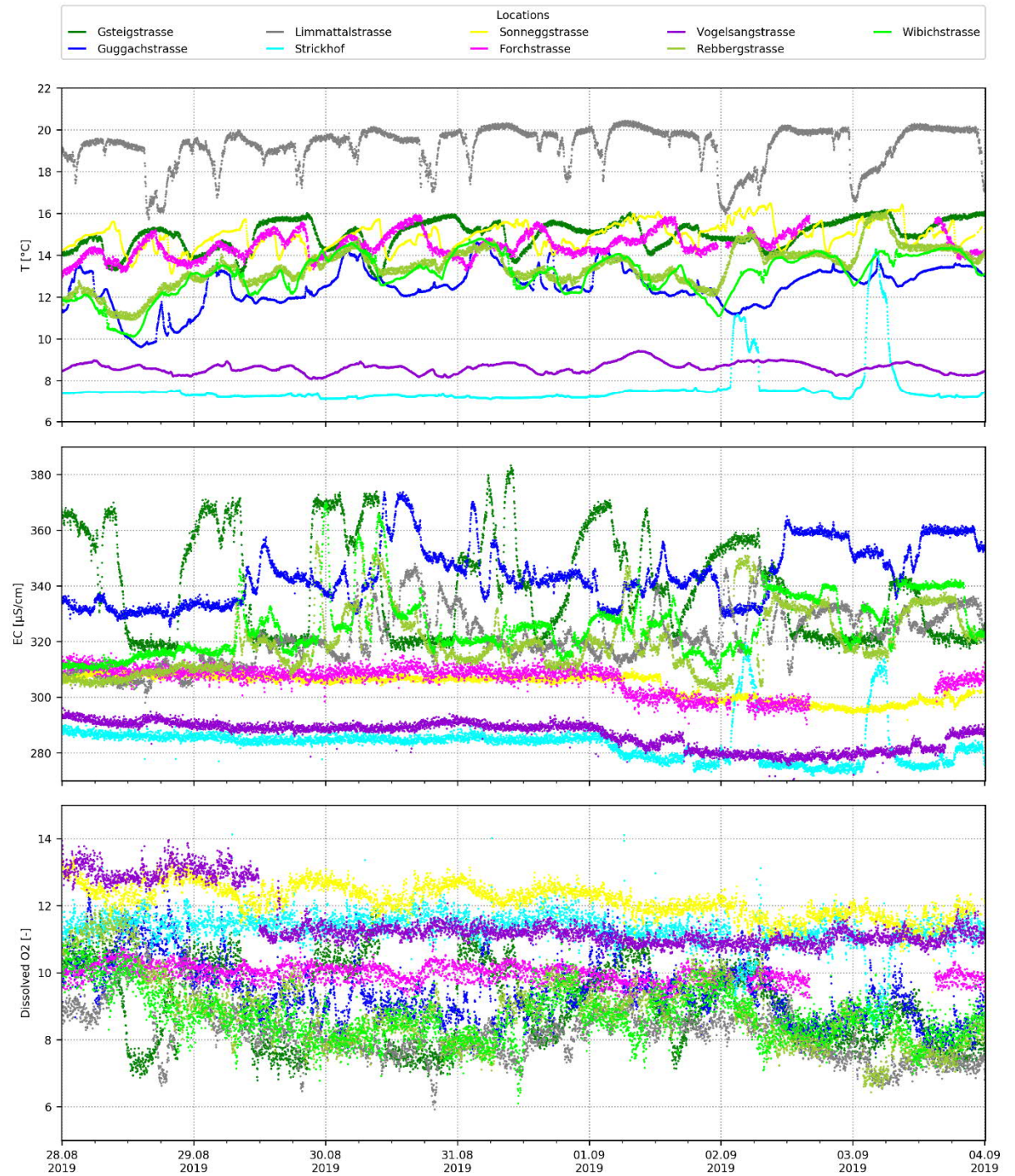
Maintenance of the system:

1100 km distribution  
450 km household  
8000 hydrants

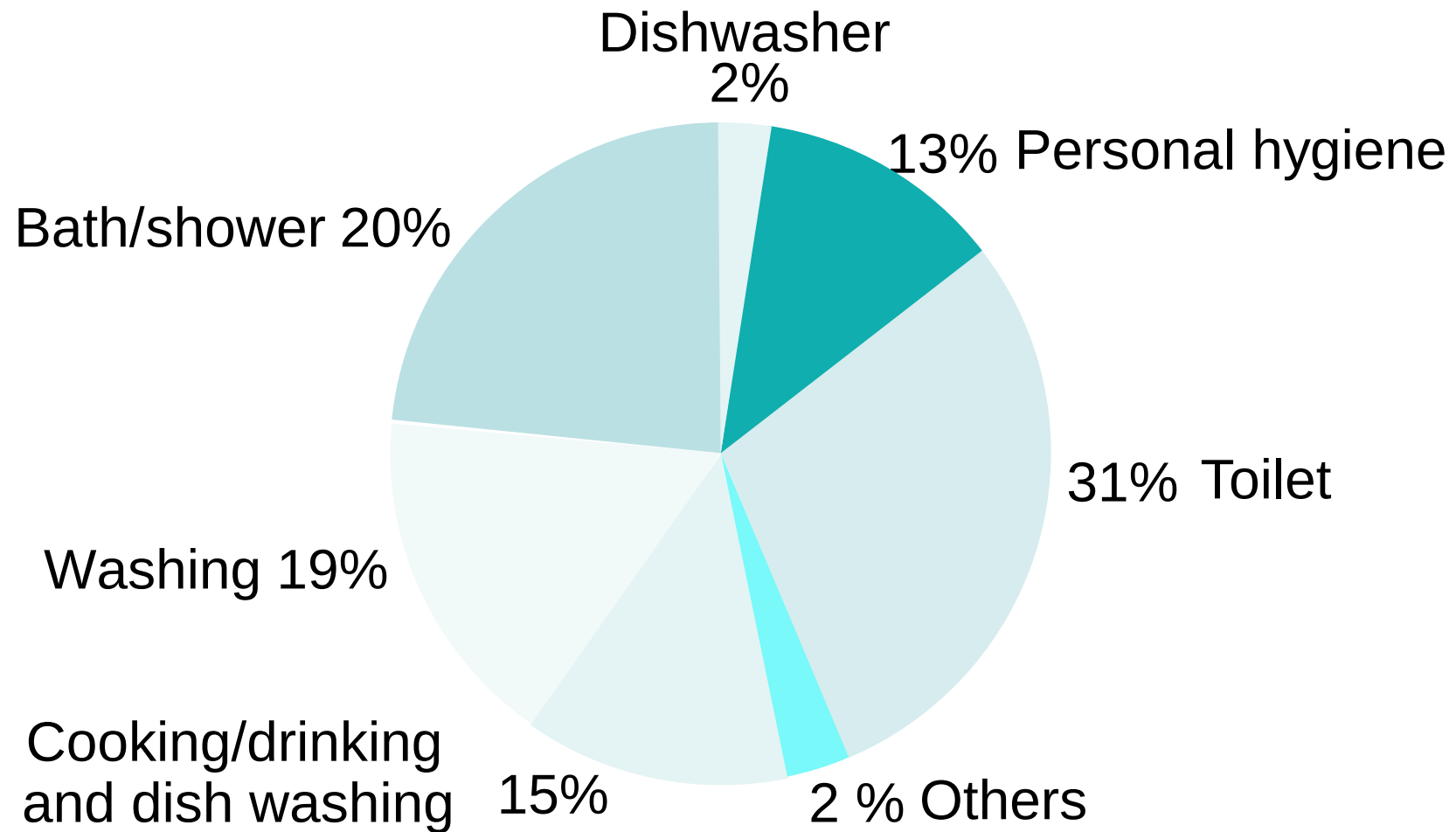
Yearly renewal rate of 30km.



# Online monitoring

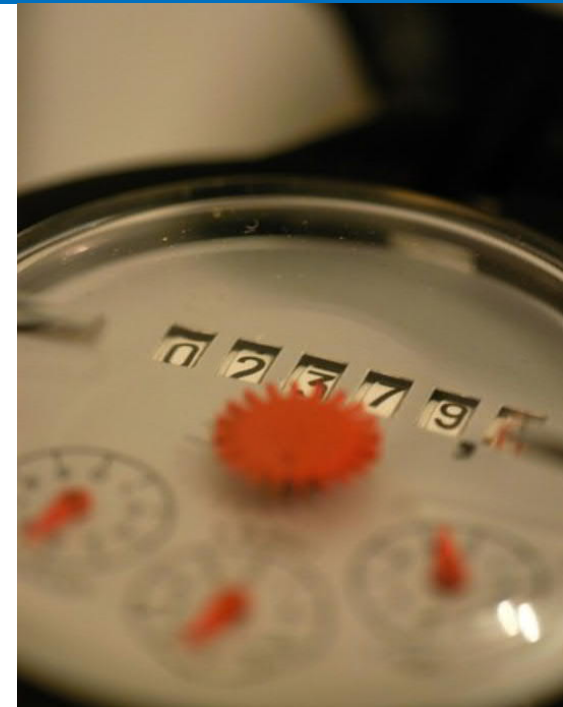


Consumption: 160 l / Person per day

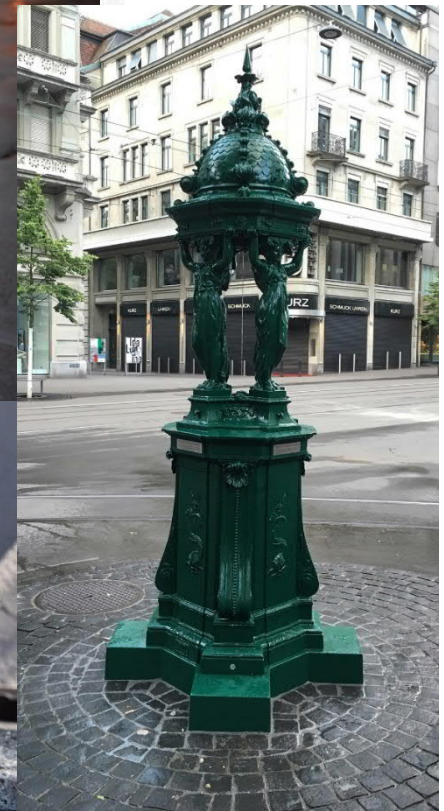
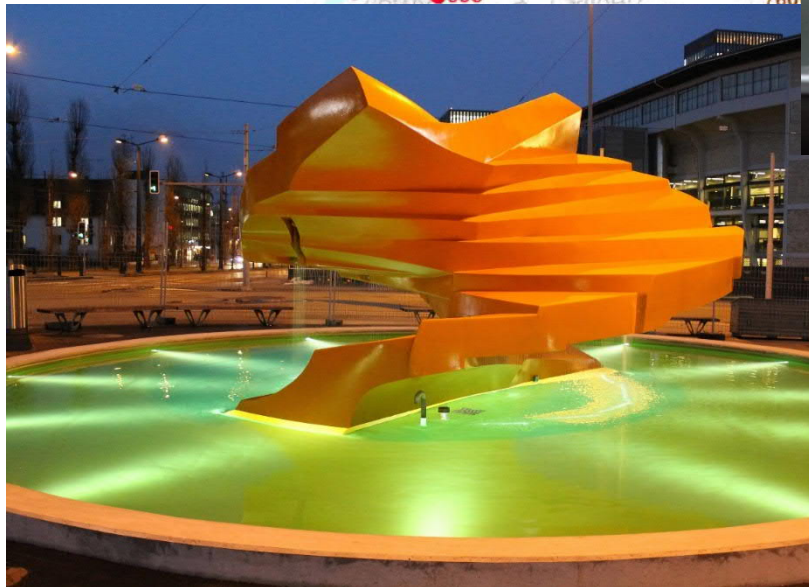
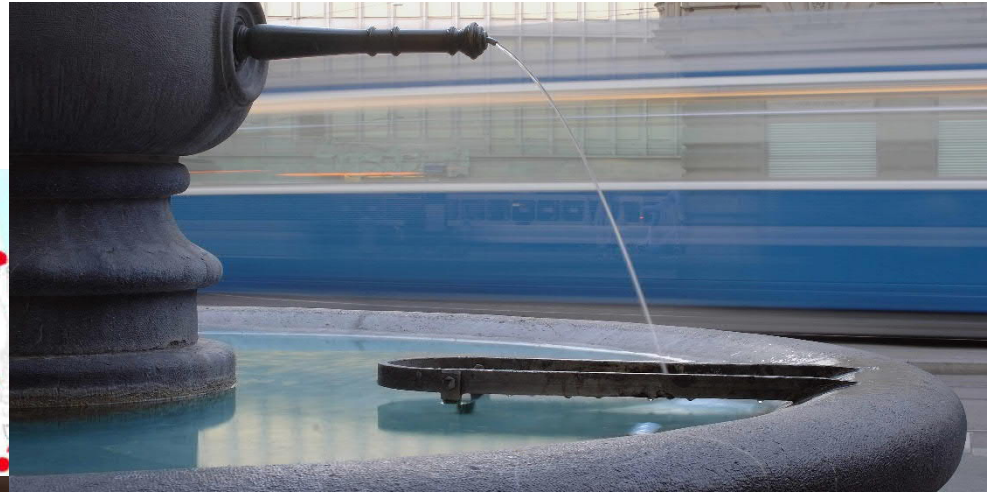


# Water pricing

Average price per m<sup>3</sup> drinking water: approx. 2 Fr.  
(yearly revenue: approx. 100 Mio.)



# 1200 fountains in the city



Thank you very much for your attention...

Any questions?

