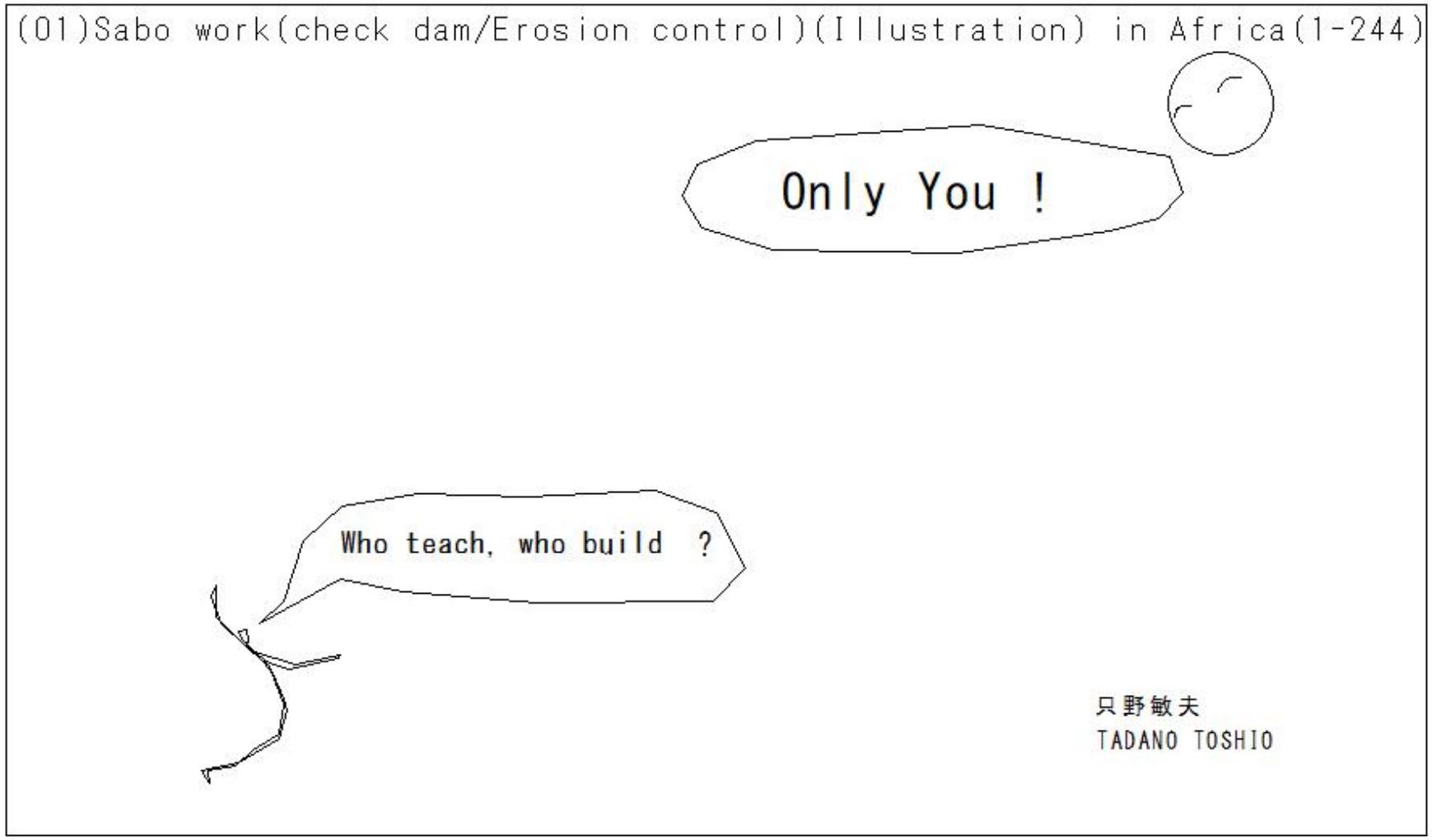
(01)Sabo work(check dam/Erosion control)(Illustration) in Africa(1-244)



(01)Sabo wReference

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3 図解テキスト　土木一般（1-5）　市ケ谷出版社
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8 土木施工用語集　東洋書店
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9 土木コンクリート用語集　東洋書店
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Dictionary of civil engineering terms　Edited by Tokyo Engineering Study Group　Engineering Publishing Co., Ltd.

只野敏夫
Tadano Toshio

1	(S1)Sabo(Erosion control)	sabo work
2	(S2)Sabo work(check dam/Erosion control)	sabo work
3	(S3)Sabo work(check dam/Erosion control)	sabo work
4	(S4)Sabo work(check dam/Erosion control)	sabo work
5	(S5)Sabo work(check dam/Erosion control)	sabo work
6	(S6)Sabo work(check dam/Erosion control)	sabo work
7	(S7)Sabo work(check dam/Erosion control)	sabo work
8	(S8)Sabo work(check dam/Erosion control)	sabo work
9	(S9)Sabo work(check dam/Erosion control)	sabo work
10	(S10)Sabo work(check dam/Erosion control)	sabo work
11	(S11)check dam	check dam
12	(S12)check dam(erosion control dam)	check dam
13	(S13)check dam(erosion control dam)	check dam
14	(S14)check dam(erosion control dam)	check dam
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28	(S28)check dam(erosion control dam)	check dam
29	(S29)check dam(erosion control dam)	check dam
30	(S30)Construction of check dam	check dam
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33	(S33)Construction of check dam	check dam
34	(S34)Construction of check dam	check dam

35 (S35)Construction of check dam	check dam
36 (S36)Construction of check dam	check dam
37 (S37)Construction of check dam	check dam
38 (S38)Construction of check dam	check dam
39 (S39)Construction of check dam	check dam
40 (S40)Construction of check dam	check dam
41 (S41)watercourse	watercourse
42 (S42)watercourse	watercourse
43 (S43)watercourse	watercourse
44 (S44)watercourse	watercourse
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46 (S46)watercourse	watercourse
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57 (S57)watercourse	watercourse
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60 (S60)watercourse	watercourse
61 (S61)watercourse	watercourse
62 (S62)watercourse	watercourse
63 (S63)watercourse	watercourse
64 (S64)revetment:bank protection	revetment:bank protection
65 (S65)revetment:bank protection	revetment:bank protection
66 (S66)revetment:bank protection	revetment:bank protection
67 (S67)revetment:bank protection	revetment:bank protection
68 (S68)revetment:bank protection	revetment:bank protection

69	(S69)revetment:bank protection	revetment:bank protection
70	(S70)revetment:bank protection	revetment:bank protection
71	(S71)hillside works	hillside works
72	(S72)hillside works	hillside works
73	(S73)hillside works	hillside works
74	(S74)hillside works	hillside works
75	(S75)hillside works	hillside works
76	(S76)hillside works	hillside works
77	(S77)hillside works	hillside works
78	(S78)hillside works	hillside works
79	(S79)hillside works	hillside works
80	(S80)hillside works	hillside works
81	(S81)hillside works	hillside works
82	(S82)Landslide prevention work	Landslide prevention work
83	(S83)Landslide prevention work	Landslide prevention work
84	(S84)Landslide prevention work	Landslide prevention work
85	(S85)Landslide prevention work	Landslide prevention work
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88	(S88)Landslide prevention work	Landslide prevention work
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90	(S90)Landslide prevention work	Landslide prevention work
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93	(S93)Landslide prevention work	Landslide prevention work
94	(S94)Landslide prevention work	Landslide prevention work
95	(S95)Landslide prevention work	Landslide prevention work
96	(S96)Landslide prevention work	Landslide prevention work
97	(S97)Sabo(Erosion control)	Sabo(Erosion control)
98	(S98)Sabo(Erosion control)	Sabo(Erosion control)
99	(S99)Sabo(Erosion control)	Sabo(Erosion control)
100	(S100)Sabo(Erosion control)	Sabo(Erosion control)
101	(S101)Sabo(Erosion control)	Sabo(Erosion control)
102	(S102)Sabo(Erosion control)	Sabo(Erosion control)

103 (S103)Sabo(Erosion control)	Sabo(Erosion control)
104 (S104)Sabo(Erosion control)-landslide restraining works	Sabo(Erosion control)
105 (S105)Sabo(Erosion control)-landslide restraining works	Sabo(Erosion control)
106 (S106)check dam(erosion control dam)	check dam(erosion control dam)
107 (S107)check dam(erosion control dam)	check dam(erosion control dam)
108 (S108)check dam(erosion control dam)	check dam(erosion control dam)
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112 (S112)check dam(erosion control dam)	check dam(erosion control dam)
113 (S113)check dam(erosion control dam)	check dam(erosion control dam)
114 (S114)check dam(erosion control dam)	check dam(erosion control dam)
115 (S115)check dam(erosion control dam)	check dam(erosion control dam)
116 (S116)Landslide	Landslide prevention method
117 (S117)Landslide prevention method	Landslide prevention method
118 (S118)Landslide prevention method	Landslide prevention method
119 (S119)Landslide prevention method	Landslide prevention method
120 (S120)Dam construction order	Dam construction order
121 (S121)Surface water drainage works	Surface water drainage works
122 (S122)Surface water drainage works	Surface water drainage works
123 (S123)Surface water drainage works	Surface water drainage works
124 (S124)check dam(erosion control dam)	check dam(erosion control dam)
125 (S125)ground sill consolidation works	ground sill consolidation works
126 (S126)drainage tunnel construction	drainage tunnel construction
127 (S127)check dam(erosion control dam)-sub dam	check dam(erosion control dam)
128 (S128)check dam(erosion control dam)-main dam	check dam(erosion control dam)
129 (S129)check dam(erosion control dam)-main dam	check dam(erosion control dam)
130 (S130)check dam(erosion control dam)-main dam	check dam(erosion control dam)
131 (S131)check dam(erosion control dam)-main dam	check dam(erosion control dam)
132 (S132)check dam(erosion control dam)-main dam	check dam(erosion control dam)
133 (S133)open culvert	Landslide prevention
134 (S134)Landslide prevention	Landslide prevention
135 (S135)Landslide prevention(horizontal boring)	Landslide prevention
136 (S136)Landslide prevention(horizontal boring)	Landslide prevention

137 (S137)Landslide prevention(horizontal boring)	Landslide prevention
138 (S138)Landslide prevention(horizontal boring)	Landslide prevention
139 (S139)water leak	water leak
140 (S140)check dam(erosion control dam)	check dam(erosion control dam)
141 (S141)check dam(erosion control dam)	check dam(erosion control dam)
142 (S142)check dam(erosion control dam)	check dam(erosion control dam)
143 (S143)torrent control works	torrent control works
144 (S144)torrent control works	torrent control works
145 (S145)torrent control works	torrent control works
146 (S146)torrent control works	torrent control works
147 (S147)hillside works	hillside works
148 (S148)hillside works-Mountainside slope cutter	hillside works
149 (S149)hillside works-Coating work	hillside works
150 (S150)hillside works-mountainside stairwork	hillside works
151 (S151)hillside works-Landslide prevention work	hillside works
152 (S152)Landslide prevention work	Landslide prevention work
153 (S153)gully protection dam	gully protection dam
154 (S154)landslide	Landslide
155 (S155)sodding(Seed spraying)	sodding
156 (S156)sodding(Vegetation mat work)	sodding
157 (S157)sodding(sodding work)	sodding
158 (S158)sodding(sodding work)	sodding
159 (S159)sodding(Vegetation board work)	sodding
160 (S160)sodding(Vegetation bagging)	sodding
161 (S161)sodding(Vegetation potting)	sodding
162 (S162)sodding(Vegetation hole drilling)	sodding
163 (S163)groundwater	groundwater
164 (S164)ground sill consolidation works	ground sill consolidation works
165 (S165)ground sill consolidation works	ground sill consolidation works
166 (S166)ground sill consolidation works	ground sill consolidation works
167 (S167)ground sill consolidation works	ground sill consolidation works
168 (S168)ground sill consolidation works	ground sill consolidation works
169 (S169)fill-type dam	fill-type dam
170 (S170)fill-type dam	fill-type dam

171 (S171)fill-type dam	fill-type dam
172 (S172)fill-type dam	fill-type dam
173 (S173)spillway	spillway
174 (S174)sediment	sediment
175 (S175)flow net	flow net
176 (S176)flow net	flow net
177 (S177)head-fall-drop	head-fall-drop
178 (S178)lining canal	lining canal
179 (S179)carrying operation	carrying operation
180 (S180)gully erosion	gully erosion
181 (S181)torrent control works	torrent control works
182 (S182)concrete spraying	concrete spraying
183 (S183)hillside works	hillside works
184 (S184)hillside works	hillside works
185 (S185)hillside works	hillside works
186 (S186)hillside covering works	hillside works
187 (S187)land slide	land slide
188 (S188)slope failure	slope failure
189 (S189)catchment well	catchment well
190 (S190)infiltration gallery	infiltration gallery
191 (S191)planted slope protection:Vegetation engineering	planted slope protection:Vegetation engineering
192 (S192)water erosion control	water erosion control
193 (S193)cycle of erosion	cycle of erosion
194 (S194)sliding surface	sliding surface
195 (S195)productive green tract of land	productive green tract of land
196 (S196)traction	traction
197 (S197)fascine	fascine
198 (S198)deposition	deposition
199 (S199)thalweg	thalweg
200 (S200)rift valley	rift valley
201 (S201)erosion control works	erosion control works
202 (S202)Geological map	Geological map
203 (S203)base failure	base failure
204 (S204)contour line	contour line

205 (S205)sediment settling	sediment settling
206 (S206)debris flow	debris flow
207 (S207)soil profile	soil profile
208 (S208)ridge line	ridge line
209 (S209)avalanche gallerry	avalanche gallerry
210 (S210)avalanche jumping	avalanche jumping
211 (S211)avalanche fence	avalanche fence
212 (S212)avalanche stoppage	avalanche stoppage
213 (S213)interflow	interflow
214 (S214)stability of the slope(slope pile)	stability of the slope(slope pile)
215 (S215)slope protection	slope protection
216 (S216)confined ground water	confined ground water
217 (S217)wind erosion control	wind erosion control
218 (S218)landslide	landslide
219 (S219)landslide restraining works	landslide restraining works
220 (S220)landslide control works	landslide control works
221 (S221)prevention for falling	prevention for falling
222 (S222)rill erosion	rill erosion
223 (S223)landslide	landslide
224 (S224)landslide	landslide
225 (S225)landslide	landslide
226 (S226)landslide	landslide
227 (S227)landslide(cliff collapse)	landslide
228 (S228)landslide(cliff collapse)	landslide
229 (S229)avalanche of sand and stone（debris flow）	landslide
230 (S230)landslide	landslide
231 (S231)landslide	landslide
232 (S232)Landslide prevention works	Landslide prevention works
233 (S233)Landslide prevention works	Landslide prevention works
234 (S234)Landslide prevention works	Landslide prevention works
235 (S235)Landslide prevention works	Landslide prevention works
236 (S236)Landslide prevention works	Landslide prevention works
237 (S237)Landslide prevention works	Landslide prevention works
238 (S238)Permeable sabo dam(check dam)	erosion control dam(check dam)

239 (S239) impervious sabo dams(check dam)	erosion control dam(check dam)
240 (S240)erosion control dam(check dam)	erosion control dam(check dam)
241 (S241)erosion control dam(check dam)	erosion control dam(check dam)
242 (S242)erosion control dam(check dam)	erosion control dam(check dam)
243 (S243)erosion control dam(check dam)	erosion control dam(check dam)
244 (S244)erosion control dam(check dam)	erosion control dam(check dam)

211 (S211)avalanche fence	avalanche fence
209 (S209)avalanche gallerry	avalanche gallerry
210 (S210)avalanche jumping	avalanche jumping
212 (S212)avalanche stoppage	avalanche stoppage
203 (S203)base failure	base failure
179 (S179)carrying operation	carrying operation
189 (S189)catchment well	catchment well
11 (S11)check dam	check dam
12 (S12)check dam(erosion control dam)	check dam
13 (S13)check dam(erosion control dam)	check dam
14 (S14)check dam(erosion control dam)	check dam
15 (S15)check dam(erosion control dam)	check dam
16 (S16)check dam(erosion control dam)	check dam
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27 (S27)check dam(erosion control dam)	check dam
28 (S28)check dam(erosion control dam)	check dam
29 (S29)check dam(erosion control dam)	check dam
30 (S30)Construction of check dam	check dam
31 (S31)Construction of check dam	check dam
32 (S32)Construction of check dam	check dam
33 (S33)Construction of check dam	check dam
34 (S34)Construction of check dam	check dam
35 (S35)Construction of check dam	check dam
36 (S36)Construction of check dam	check dam
37 (S37)Construction of check dam	check dam

38 (S38)Construction of check dam	check dam
39 (S39)Construction of check dam	check dam
40 (S40)Construction of check dam	check dam
106 (S106)check dam(erosion control dam)	check dam(erosion control dam)
107 (S107)check dam(erosion control dam)	check dam(erosion control dam)
108 (S108)check dam(erosion control dam)	check dam(erosion control dam)
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115 (S115)check dam(erosion control dam)	check dam(erosion control dam)
124 (S124)check dam(erosion control dam)	check dam(erosion control dam)
127 (S127)check dam(erosion control dam)-sub dam	check dam(erosion control dam)
128 (S128)check dam(erosion control dam)-main dam	check dam(erosion control dam)
129 (S129)check dam(erosion control dam)-main dam	check dam(erosion control dam)
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142 (S142)check dam(erosion control dam)	check dam(erosion control dam)
182 (S182)concrete spraying	concrete spraying
216 (S216)confined ground water	confined ground water
204 (S204)contour line	contour line
193 (S193)cycle of erosion	cycle of erosion
120 (S120)Dam construction order	Dam construction order
206 (S206)debris flow	debris flow
198 (S198)deposition	deposition
126 (S126)drainage tunnel construction	drainage tunnel construction
238 (S238)Permeable sabo dam(check dam)	erosion control dam(check dam)
239 (S239) impervious sabo dams(check dam)	erosion control dam(check dam)
240 (S240)erosion control dam(check dam)	erosion control dam(check dam)

241 (S241)erosion control dam(check dam)	erosion control dam(check dam)
242 (S242)erosion control dam(check dam)	erosion control dam(check dam)
243 (S243)erosion control dam(check dam)	erosion control dam(check dam)
244 (S244)erosion control dam(check dam)	erosion control dam(check dam)
201 (S201)erosion control works	erosion control works
197 (S197)fascine	fascine
169 (S169)fill-type dam	fill-type dam
170 (S170)fill-type dam	fill-type dam
171 (S171)fill-type dam	fill-type dam
172 (S172)fill-type dam	fill-type dam
175 (S175)flow net	flow net
176 (S176)flow net	flow net
202 (S202)Geological map	Geological map
125 (S125)ground sill consolidation works	ground sill consolidation works
164 (S164)ground sill consolidation works	ground sill consolidation works
165 (S165)ground sill consolidation works	ground sill consolidation works
166 (S166)ground sill consolidation works	ground sill consolidation works
167 (S167)ground sill consolidation works	ground sill consolidation works
168 (S168)ground sill consolidation works	ground sill consolidation works
163 (S163)groundwater	groundwater
180 (S180)gully erosion	gully erosion
153 (S153)gully protection dam	gully protection dam
177 (S177)head-fall-drop	head-fall-drop
147 (S147)hillside works	hillside works
148 (S148)hillside works-Mountainside slope cutter	hillside works
149 (S149)hillside works-Coating work	hillside works
150 (S150)hillside works-mountainside stairwork	hillside works
151 (S151)hillside works-Landslide prevention work	hillside works
183 (S183)hillside works	hillside works
184 (S184)hillside works	hillside works
185 (S185)hillside works	hillside works
186 (S186)hillside covering works	hillside works
71 (S71)hillside works	hillside works
72 (S72)hillside works	hillside works

73 (S73)hillside works	hillside works
74 (S74)hillside works	hillside works
75 (S75)hillside works	hillside works
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78 (S78)hillside works	hillside works
79 (S79)hillside works	hillside works
80 (S80)hillside works	hillside works
81 (S81)hillside works	hillside works
190 (S190)infiltration gallery	infiltration gallery
213 (S213)interflow	interflow
187 (S187)land slide	land slide
223 (S223)landslide	landslide
224 (S224)landslide	landslide
225 (S225)landslide	landslide
226 (S226)landslide	landslide
227 (S227)landslide(cliff collapse)	landslide
228 (S228)landslide(cliff collapse)	landslide
229 (S229)avalanche of sand and stone（debris flow）	landslide
230 (S230)landslide	landslide
231 (S231)landslide	landslide
154 (S154)landslide	Landslide
218 (S218)landslide	landslide
220 (S220)landslide control works	landslide control works
133 (S133)open culvert	Landslide prevention
134 (S134)Landslide prevention	Landslide prevention
135 (S135)Landslide prevention(horizontal boring)	Landslide prevention
136 (S136)Landslide prevention(horizontal boring)	Landslide prevention
137 (S137)Landslide prevention(horizontal boring)	Landslide prevention
138 (S138)Landslide prevention(horizontal boring)	Landslide prevention
116 (S116)Landslide	Landslide prevention method
117 (S117)Landslide prevention method	Landslide prevention method
118 (S118)Landslide prevention method	Landslide prevention method
119 (S119)Landslide prevention method	Landslide prevention method

82 (S82)Landslide prevention work	Landslide prevention work
83 (S83)Landslide prevention work	Landslide prevention work
84 (S84)Landslide prevention work	Landslide prevention work
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87 (S87)Landslide prevention work	Landslide prevention work
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91 (S91)Landslide prevention work	Landslide prevention work
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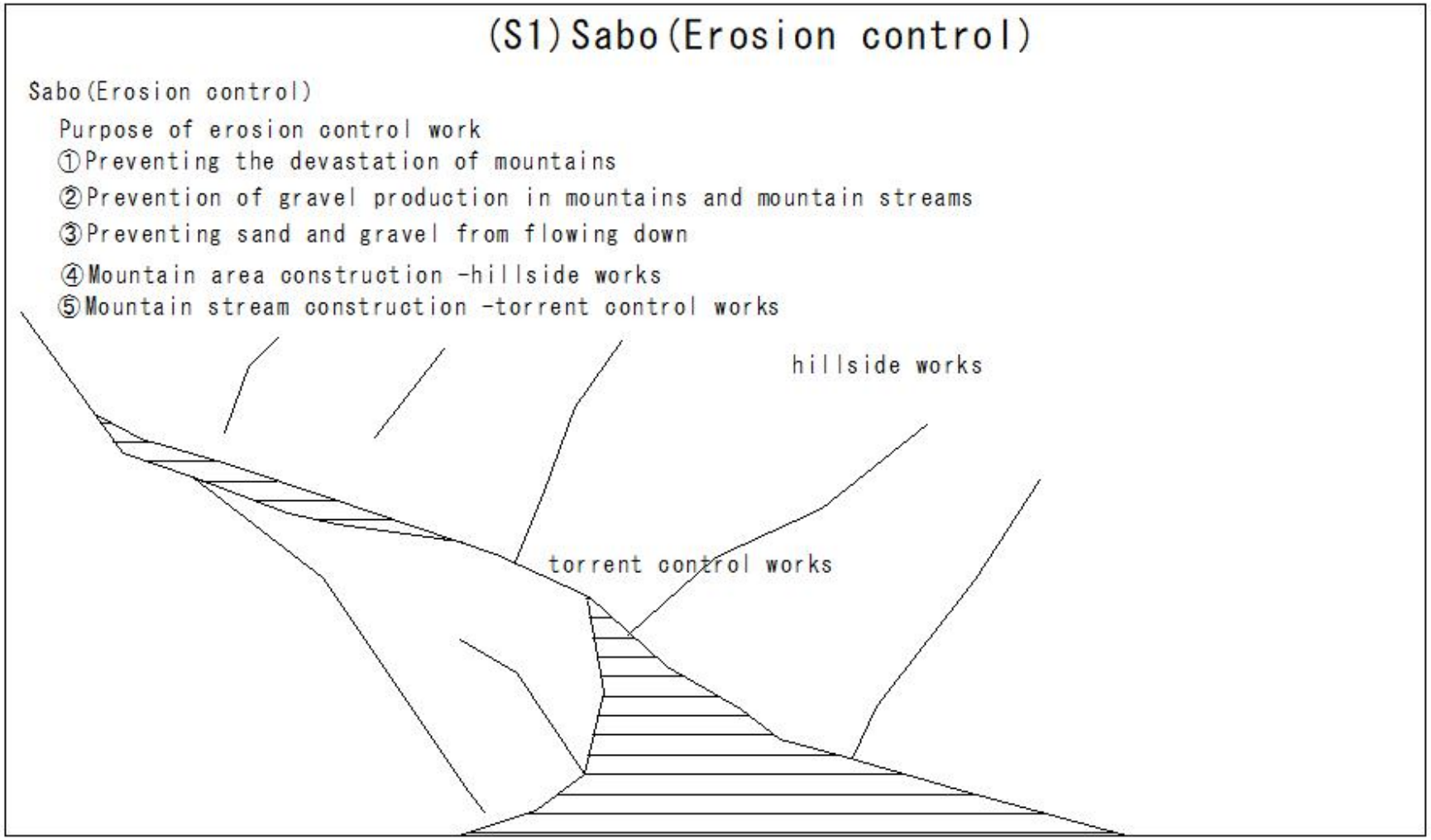
94 (S94)Landslide prevention work	Landslide prevention work
95 (S95)Landslide prevention work	Landslide prevention work
96 (S96)Landslide prevention work	Landslide prevention work
152 (S152)Landslide prevention work	Landslide prevention work
232 (S232)Landslide prevention works	Landslide prevention works
233 (S233)Landslide prevention works	Landslide prevention works
234 (S234)Landslide prevention works	Landslide prevention works
235 (S235)Landslide prevention works	Landslide prevention works
236 (S236)Landslide prevention works	Landslide prevention works
237 (S237)Landslide prevention works	Landslide prevention works
219 (S219)landslide restraining works	landslide restraining works
178 (S178)lining canal	lining canal
191 (S191)planted slope protection:Vegetation engineering	planted slope protection:Vegetation engineering
221 (S221)prevention for falling	prevention for falling
195 (S195)productive green tract of land	productive green tract of land
64 (S64)revetment:bank protection	revetment:bank protection
65 (S65)revetment:bank protection	revetment:bank protection
66 (S66)revetment:bank protection	revetment:bank protection
67 (S67)revetment:bank protection	revetment:bank protection
68 (S68)revetment:bank protection	revetment:bank protection
69 (S69)revetment:bank protection	revetment:bank protection
70 (S70)revetment:bank protection	revetment:bank protection

208 (S208)ridge line	ridge line
200 (S200)rift valley	rift valley
222 (S222)rill erosion	rill erosion
1 (S1)Sabo(Erosion control)	sabo work
2 (S2)Sabo work(check dam/Erosion control)	sabo work
3 (S3)Sabo work(check dam/Erosion control)	sabo work
4 (S4)Sabo work(check dam/Erosion control)	sabo work
5 (S5)Sabo work(check dam/Erosion control)	sabo work
6 (S6)Sabo work(check dam/Erosion control)	sabo work
7 (S7)Sabo work(check dam/Erosion control)	sabo work
8 (S8)Sabo work(check dam/Erosion control)	sabo work
9 (S9)Sabo work(check dam/Erosion control)	sabo work
10 (S10)Sabo work(check dam/Erosion control)	sabo work
97 (S97)Sabo(Erosion control)	Sabo(Erosion control)
98 (S98)Sabo(Erosion control)	Sabo(Erosion control)
99 (S99)Sabo(Erosion control)	Sabo(Erosion control)
100 (S100)Sabo(Erosion control)	Sabo(Erosion control)
101 (S101)Sabo(Erosion control)	Sabo(Erosion control)
102 (S102)Sabo(Erosion control)	Sabo(Erosion control)
103 (S103)Sabo(Erosion control)	Sabo(Erosion control)
104 (S104)Sabo(Erosion control)-landslide restraining works	Sabo(Erosion control)
105 (S105)Sabo(Erosion control)-landslide restraining works	Sabo(Erosion control)
174 (S174)sediment	sediment
205 (S205)sediment settling	sediment settling
194 (S194)sliding surface	sliding surface
188 (S188)slope failure	slope failure
215 (S215)slope protection	slope protection
155 (S155)sodding(Seed spraying)	sodding
156 (S156)sodding(Vegetation mat work)	sodding
157 (S157)sodding(sodding work)	sodding
158 (S158)sodding(sodding work)	sodding
159 (S159)sodding(Vegetation board work)	sodding
160 (S160)sodding(Vegetation bagging)	sodding
161 (S161)sodding(Vegetation potting)	sodding

162 (S162)sodding(Vegetation hole drilling)	sodding
207 (S207)soil profile	soil profile
173 (S173)spillway	spillway
214 (S214)stability of the slope(slope pile)	stability of the slope(slope pile)
121 (S121)Surface water drainage works	Surface water drainage works
122 (S122)Surface water drainage works	Surface water drainage works
123 (S123)Surface water drainage works	Surface water drainage works
199 (S199)thalweg	thalweg
143 (S143)torrent control works	torrent control works
144 (S144)torrent control works	torrent control works
145 (S145)torrent control works	torrent control works
146 (S146)torrent control works	torrent control works
181 (S181)torrent control works	torrent control works
196 (S196)traction	traction
192 (S192)water erosion control	water erosion control
139 (S139)water leak	water leak
41 (S41)watercourse	watercourse
42 (S42)watercourse	watercourse
43 (S43)watercourse	watercourse
44 (S44)watercourse	watercourse
45 (S45)watercourse	watercourse
46 (S46)watercourse	watercourse
47 (S47)watercourse	watercourse
48 (S48)watercourse	watercourse
49 (S49)watercourse	watercourse
50 (S50)watercourse	watercourse
51 (S51)watercourse	watercourse
52 (S52)watercourse	watercourse
53 (S53)watercourse	watercourse
54 (S54)watercourse	watercourse
55 (S55)watercourse	watercourse
56 (S56)watercourse	watercourse
57 (S57)watercourse	watercourse
58 (S58)watercourse	watercourse

59 (S59)watercourse	watercourse
60 (S60)watercourse	watercourse
61 (S61)watercourse	watercourse
62 (S62)watercourse	watercourse
63 (S63)watercourse	watercourse
217 (S217)wind erosion control	wind erosion control

(S1)Sabo(Erosion control)



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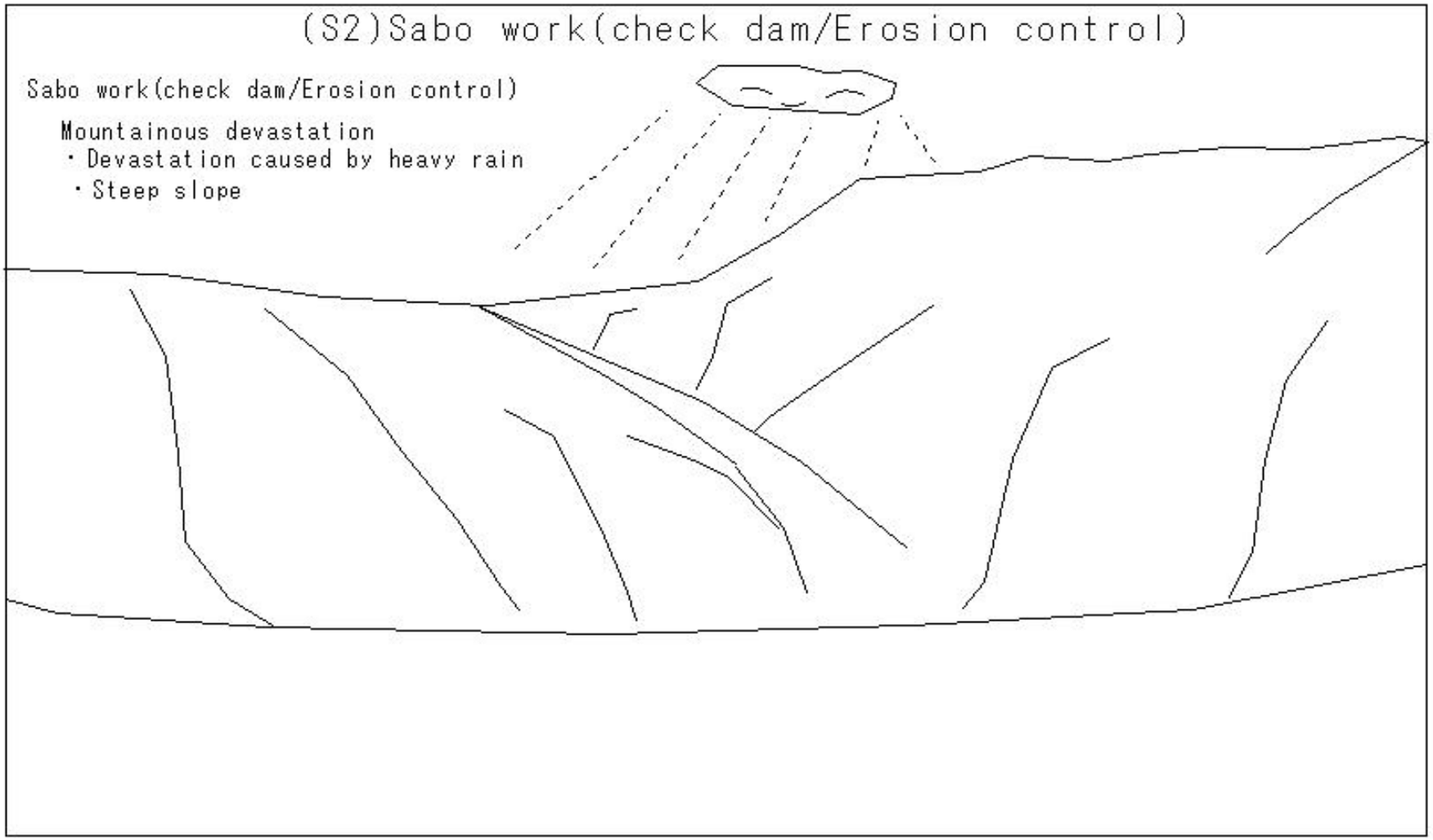

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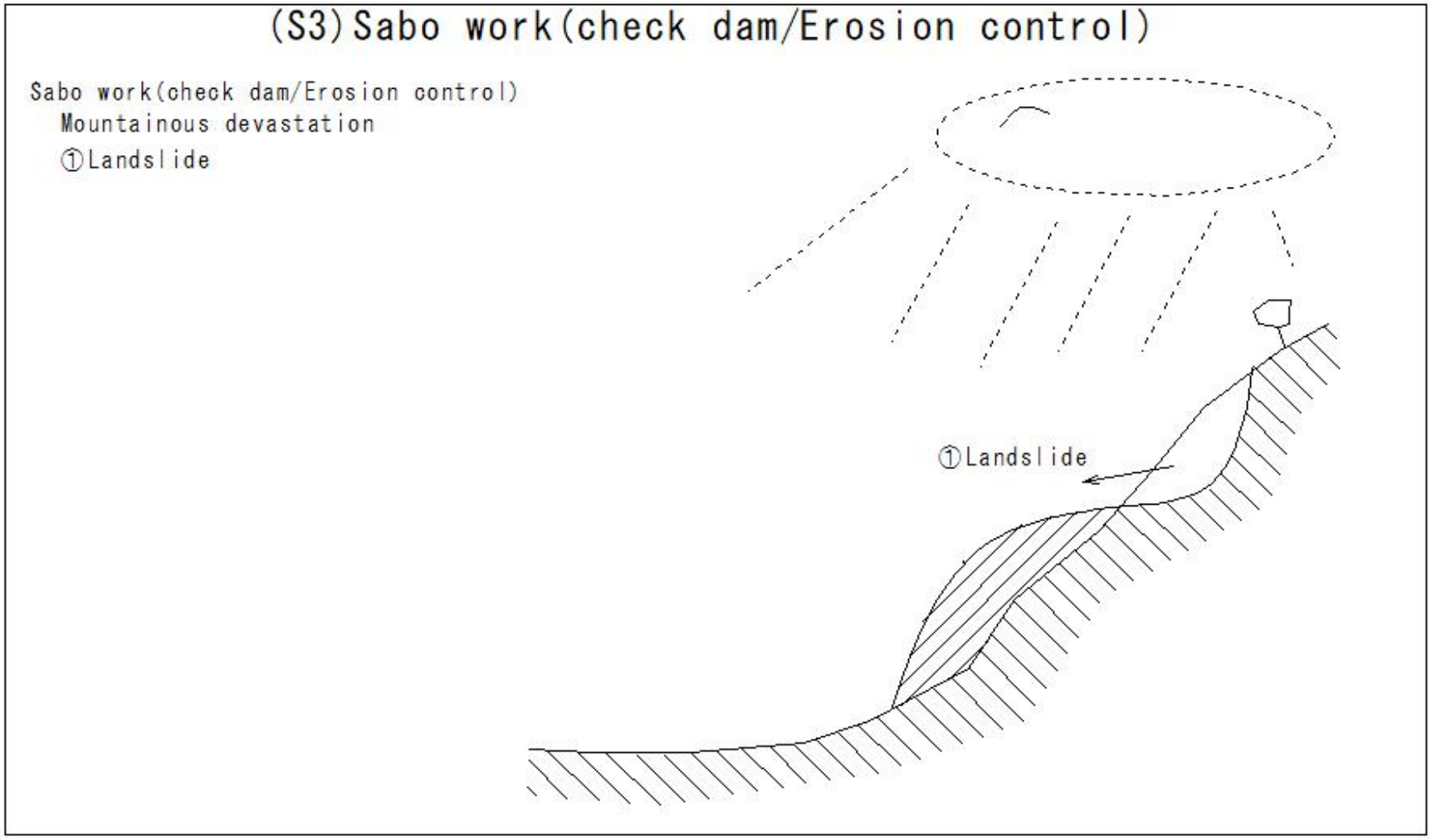

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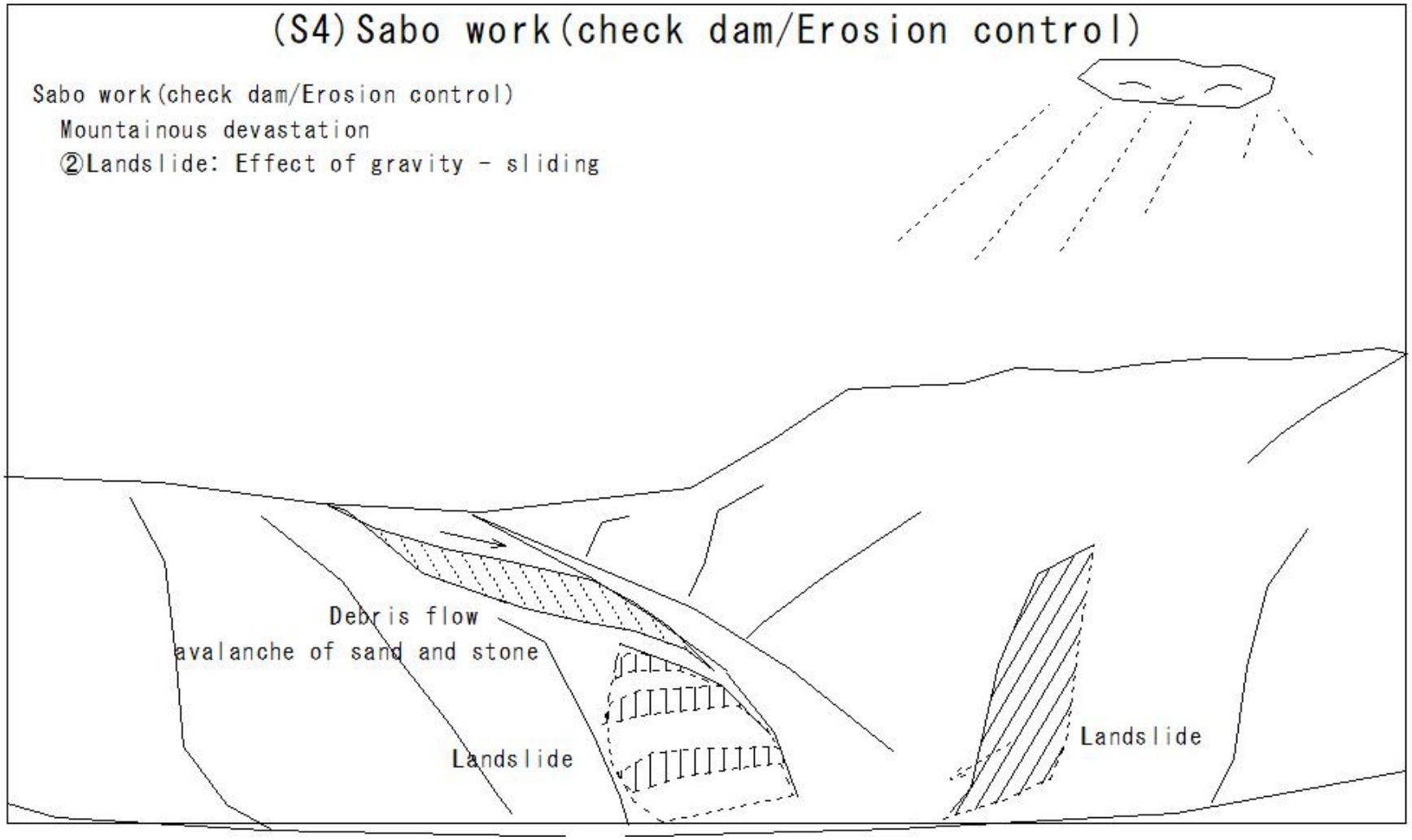

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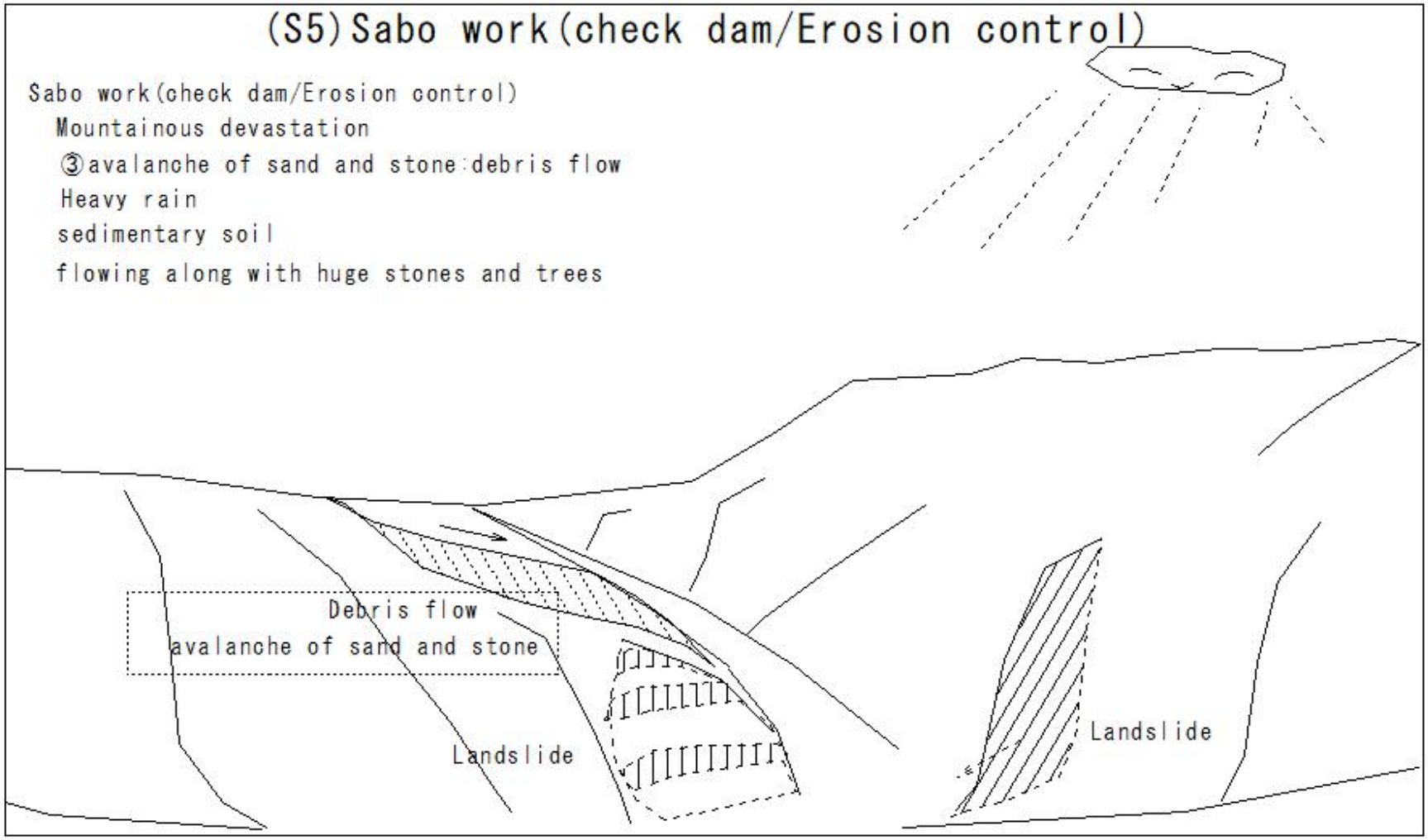

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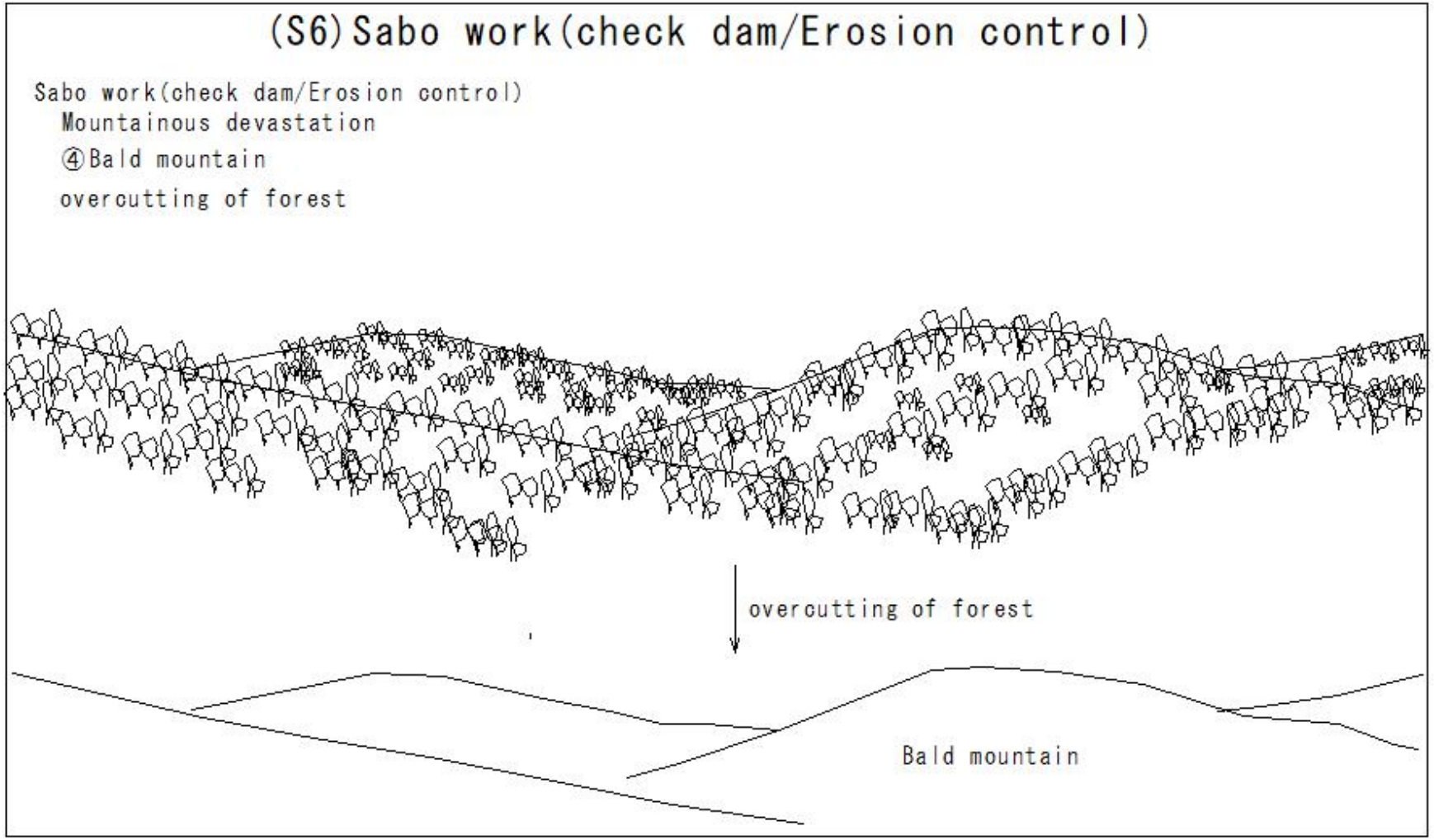

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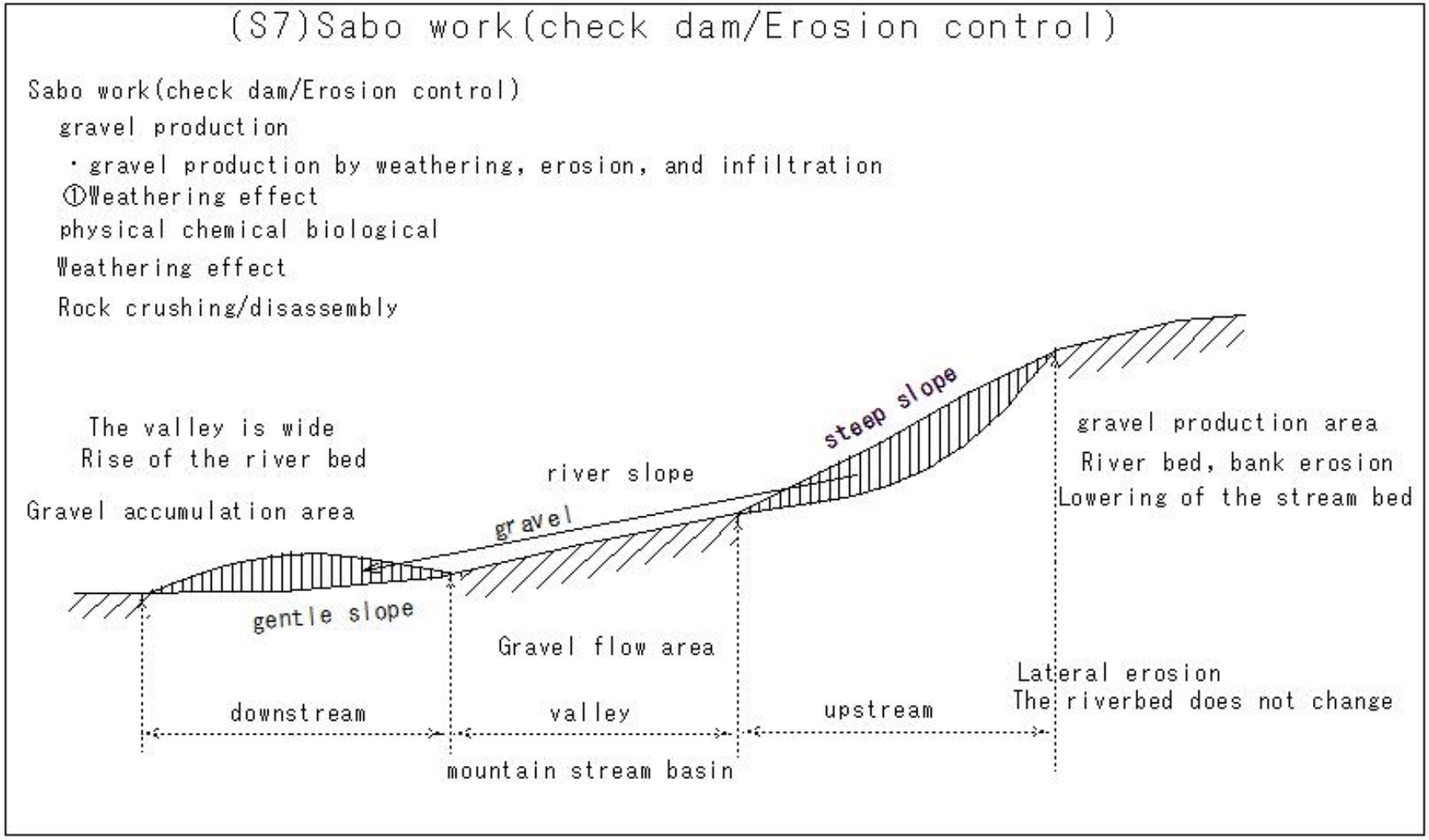

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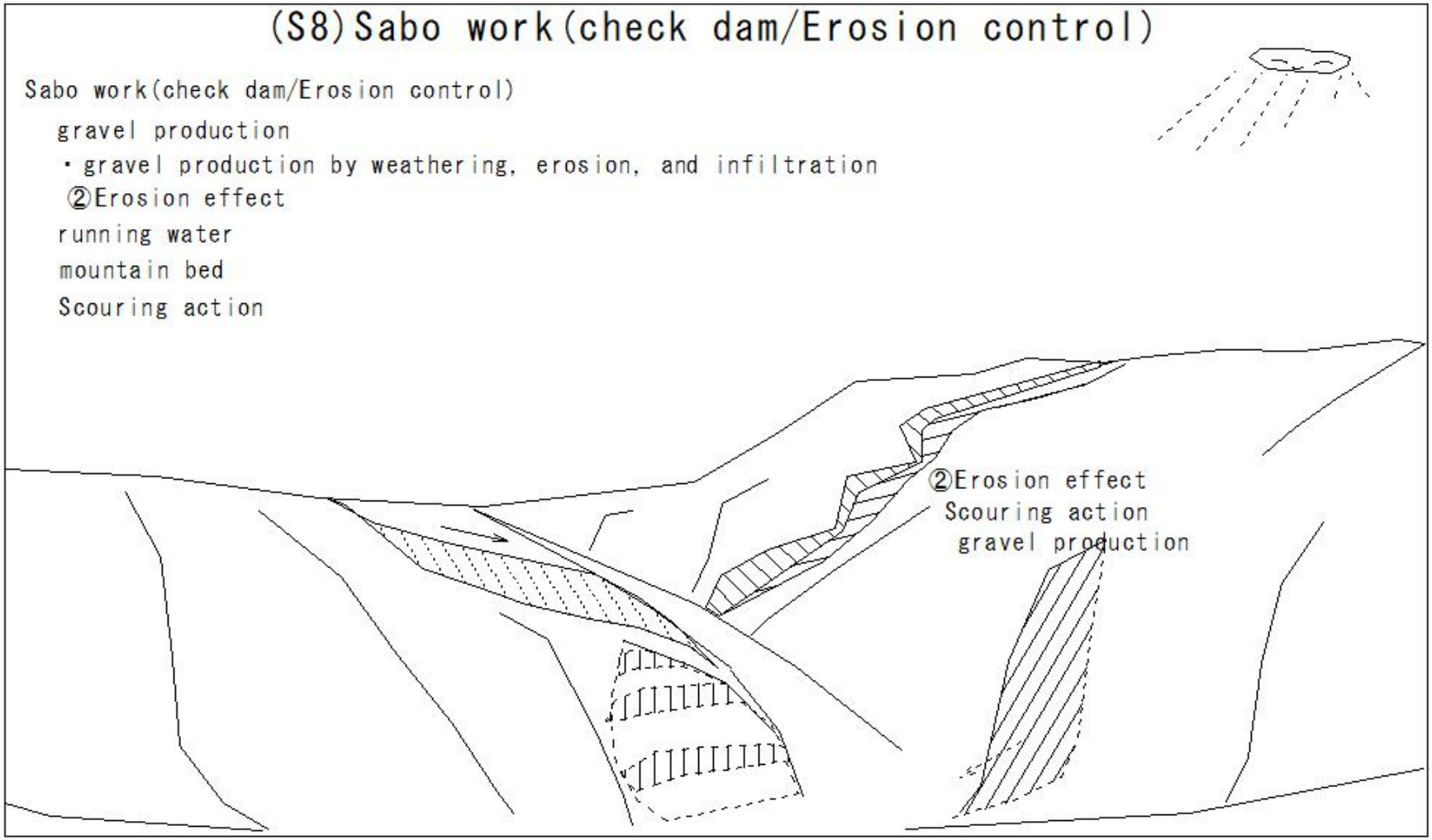

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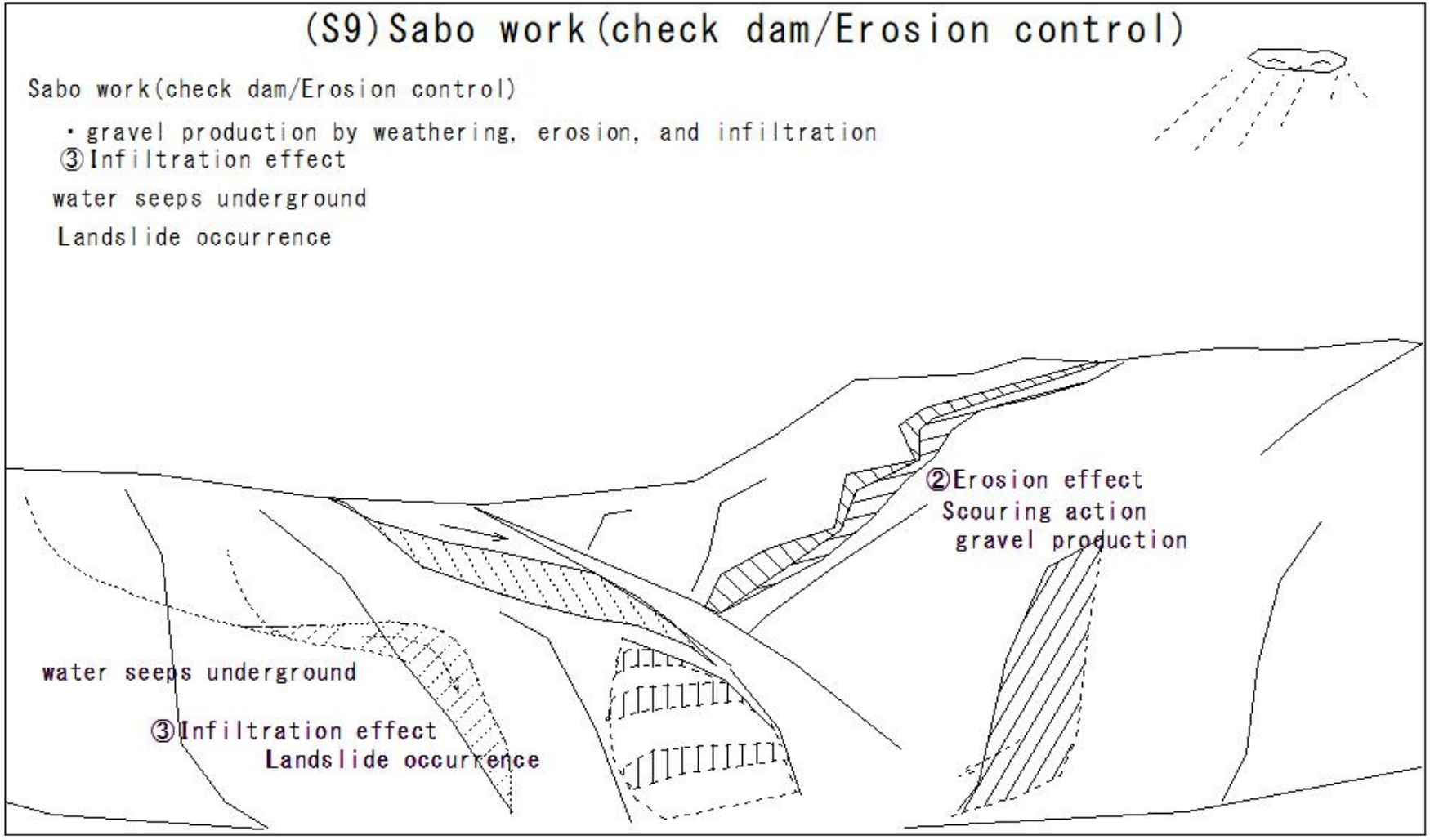
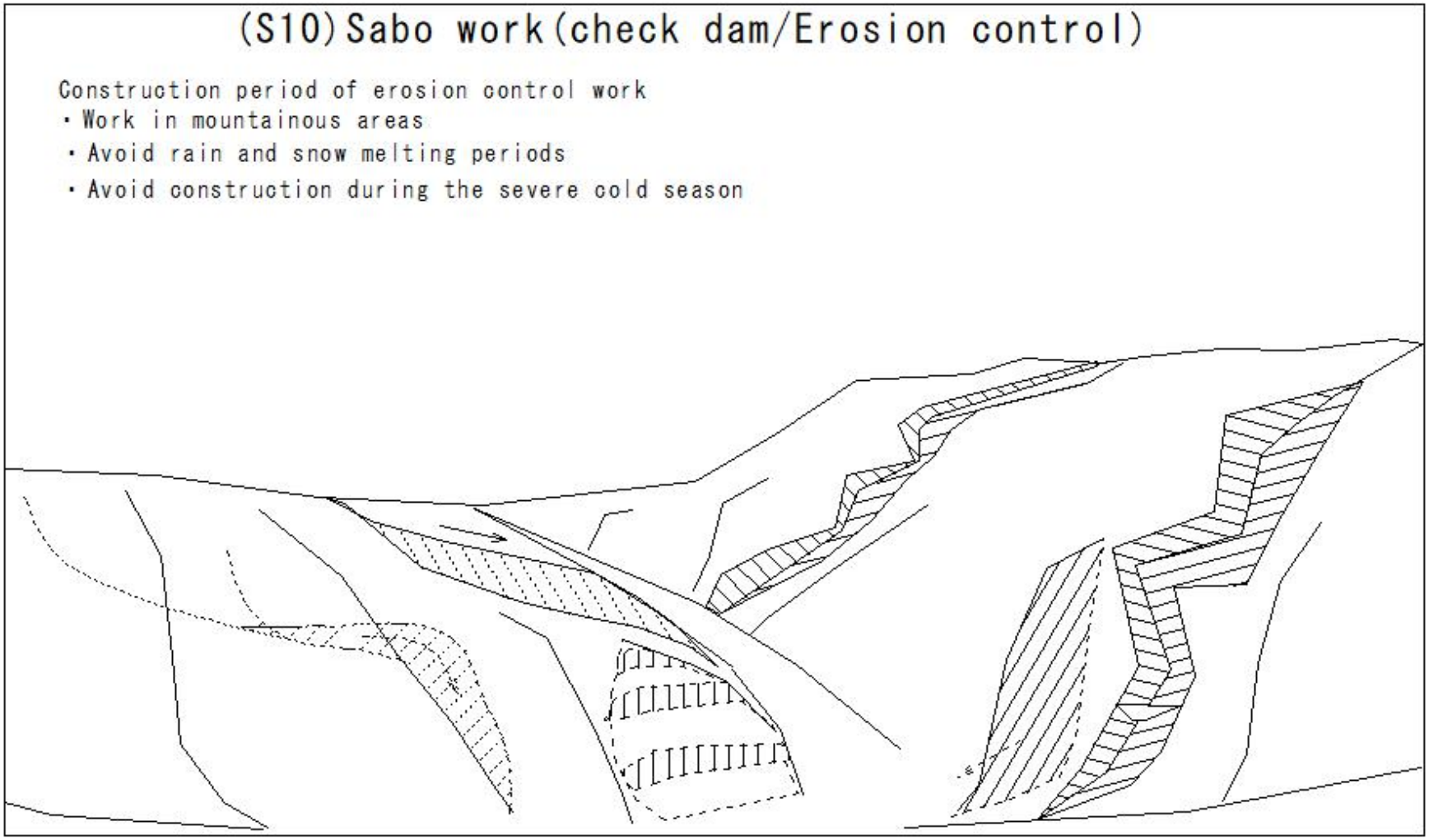


(S10)Sabo work(check dam/Erosion control)



(S11)check dam

(S11)check dam

check dam(erosion control dam)

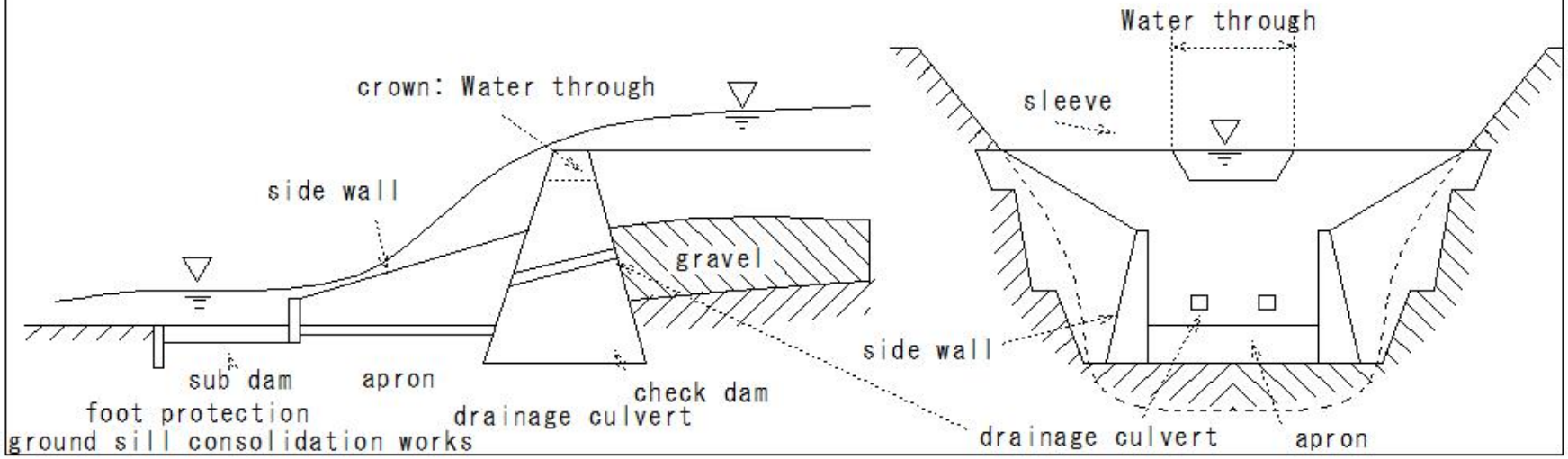
Purpose of check dam

①Prevention of vertical and horizontal erosion of river channels

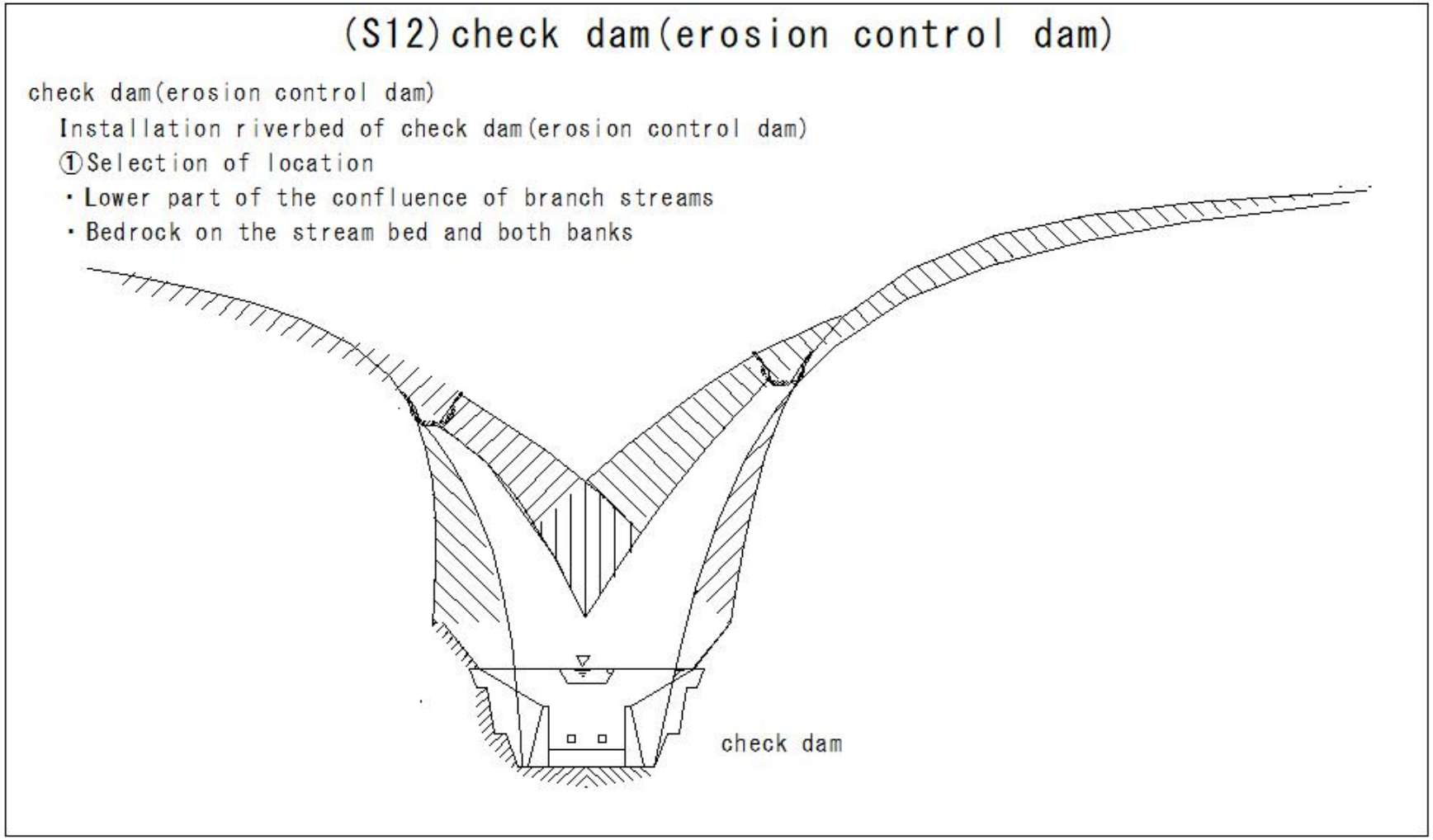
②Storage and regulation of washed-down soil and gravel

③Relax the slope of the stream bed and weaken the pushing force of running water

④Securing the base and preventing landslides using accumulated earth and sand



(S12)check dam(erosion control dam)



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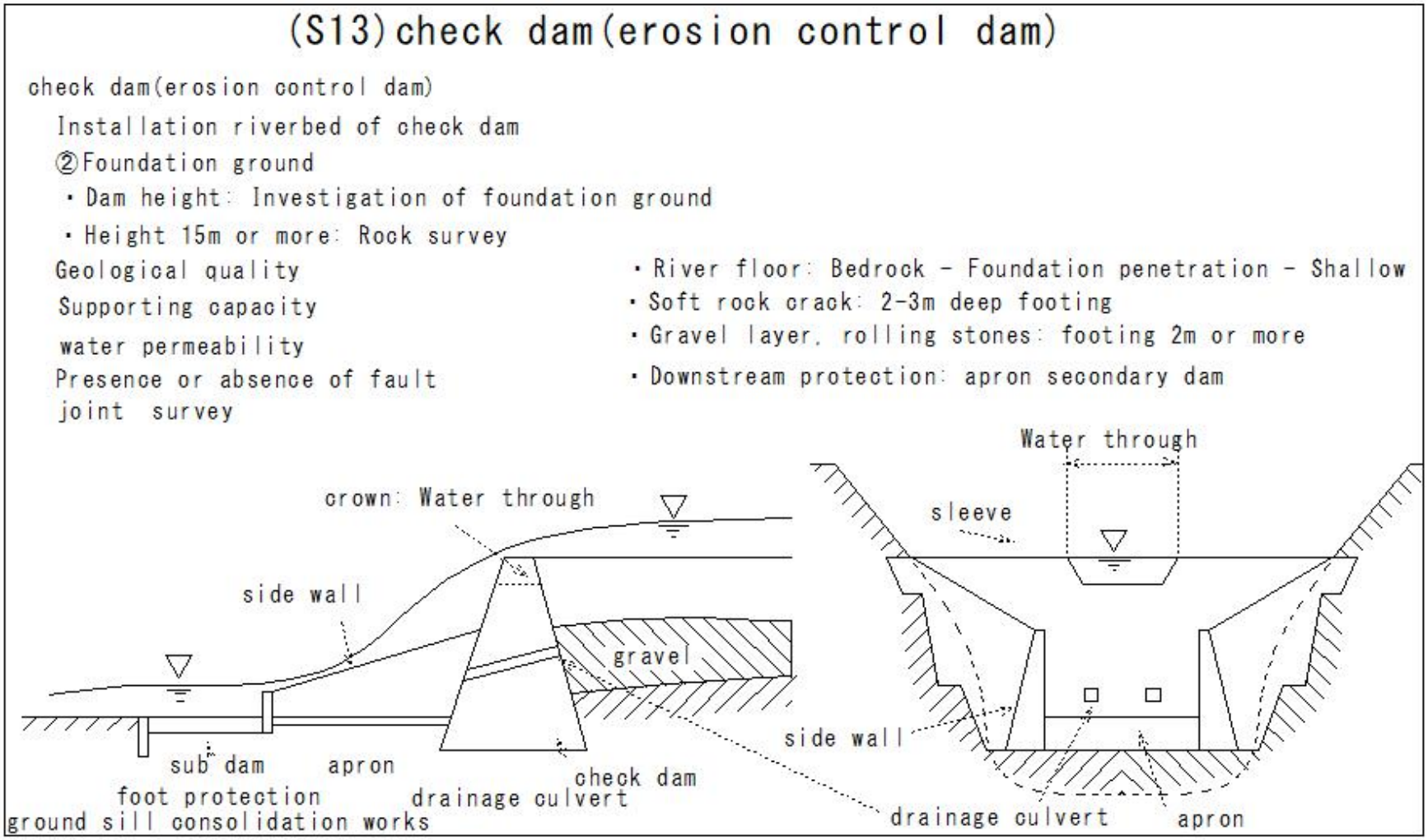

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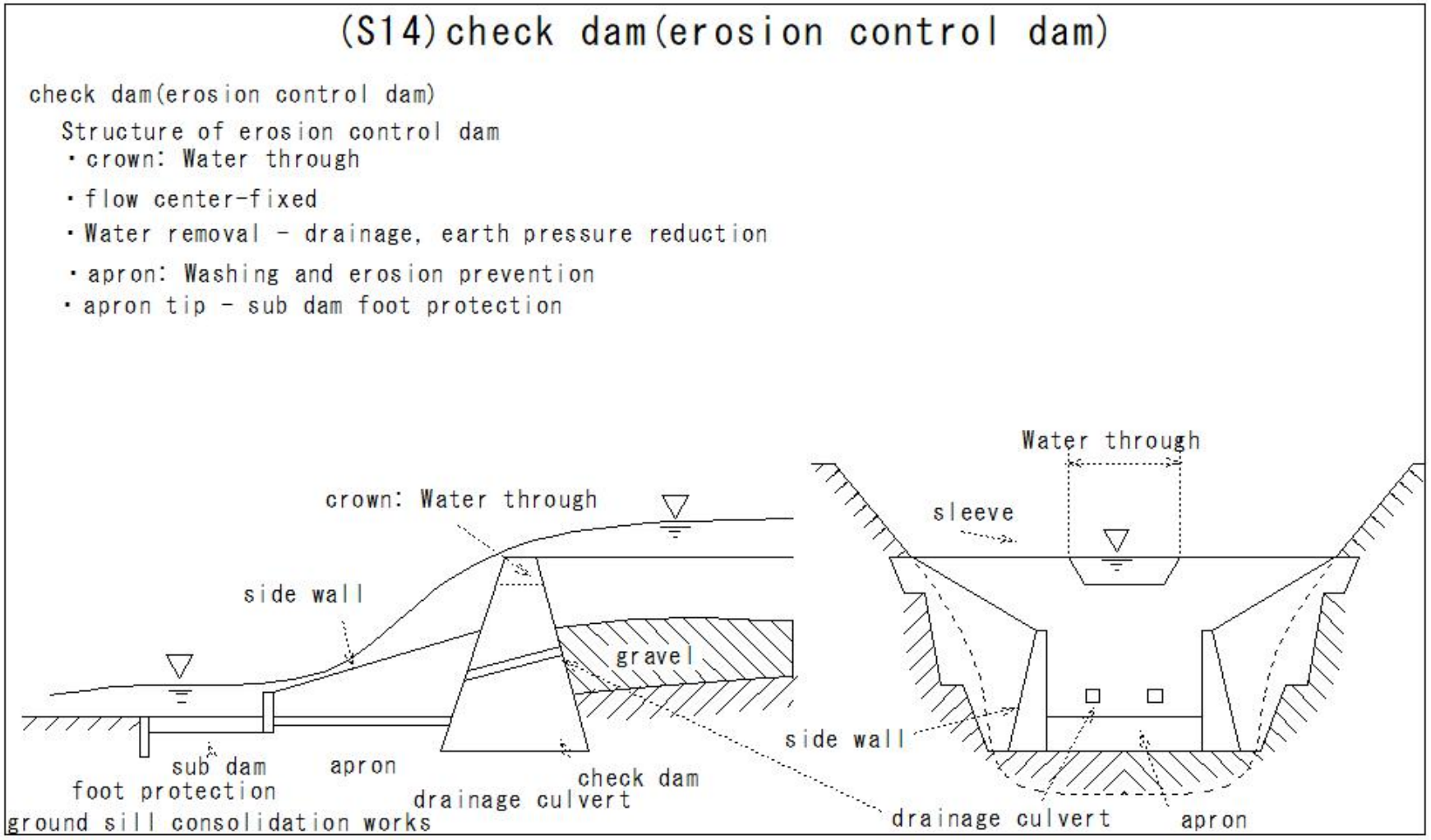
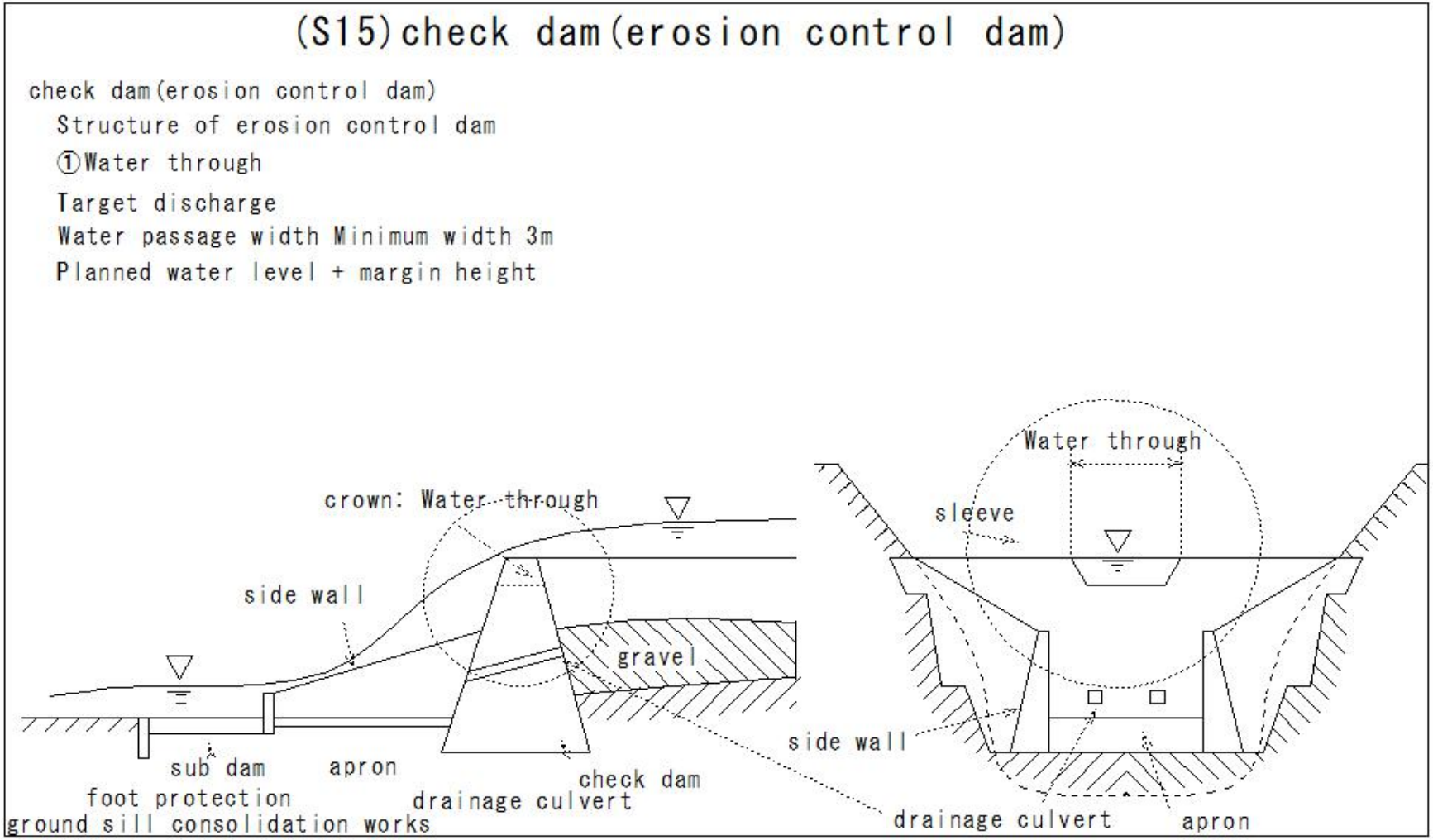
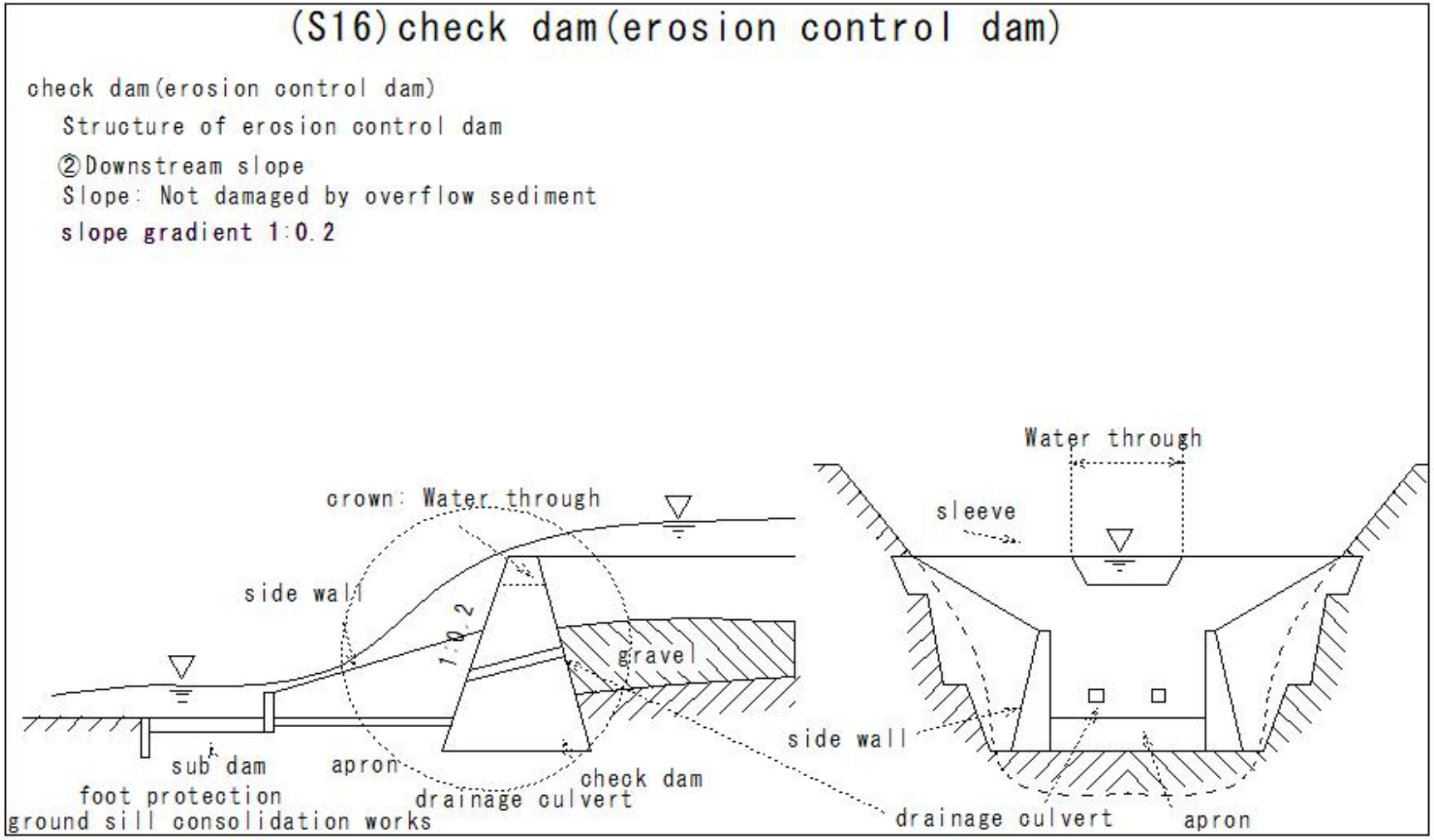


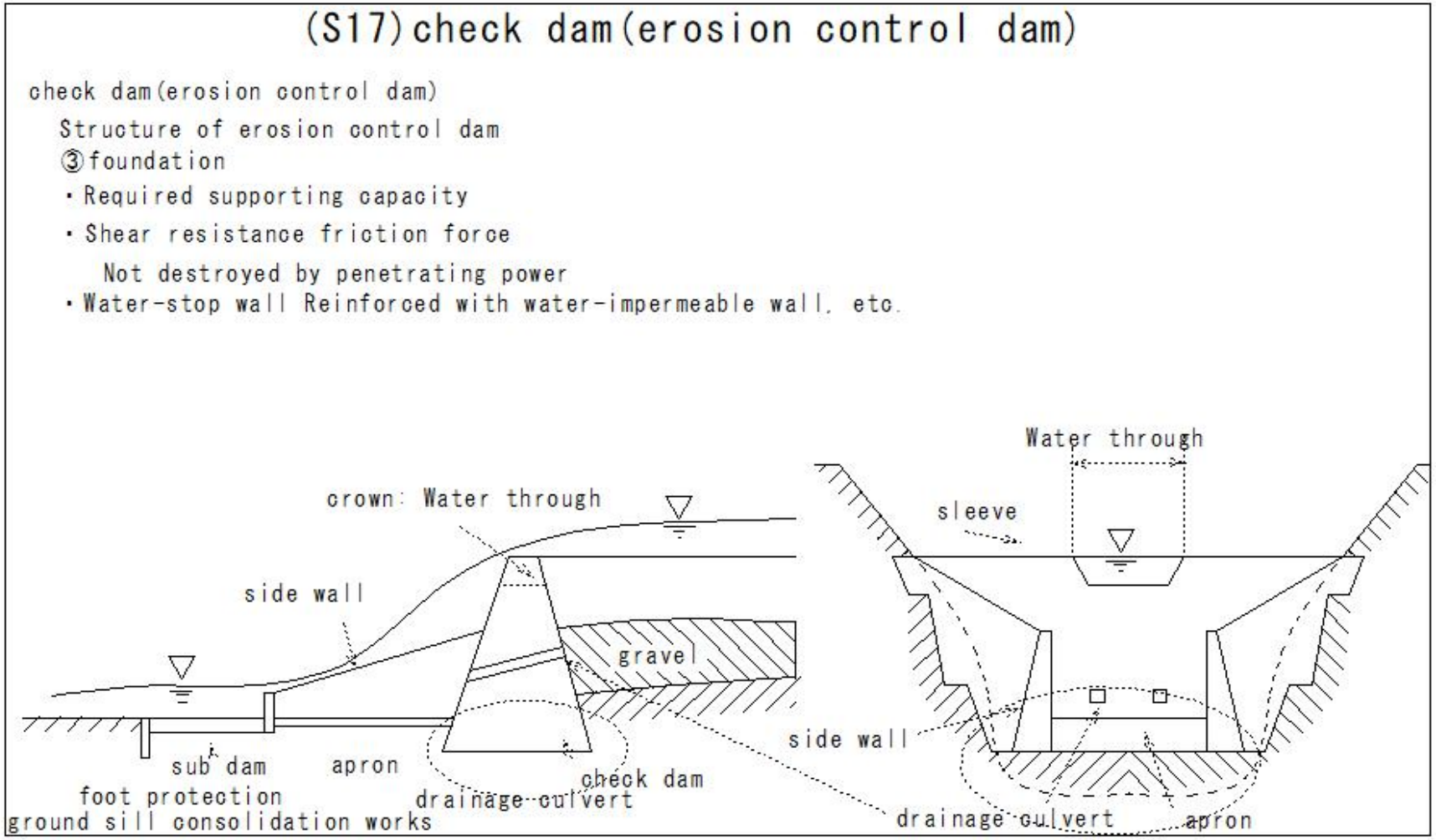
(S15)check dam(erosion control dam)



(S16)check dam(erosion control dam)



(S17)check dam(erosion control dam)



(S18)check dam(erosion control dam)

(S18)check dam(erosion control dam)

check dam(erosion control dam)

Structure of erosion control dam

④Sleeves

・Do not allow flood water to overflow

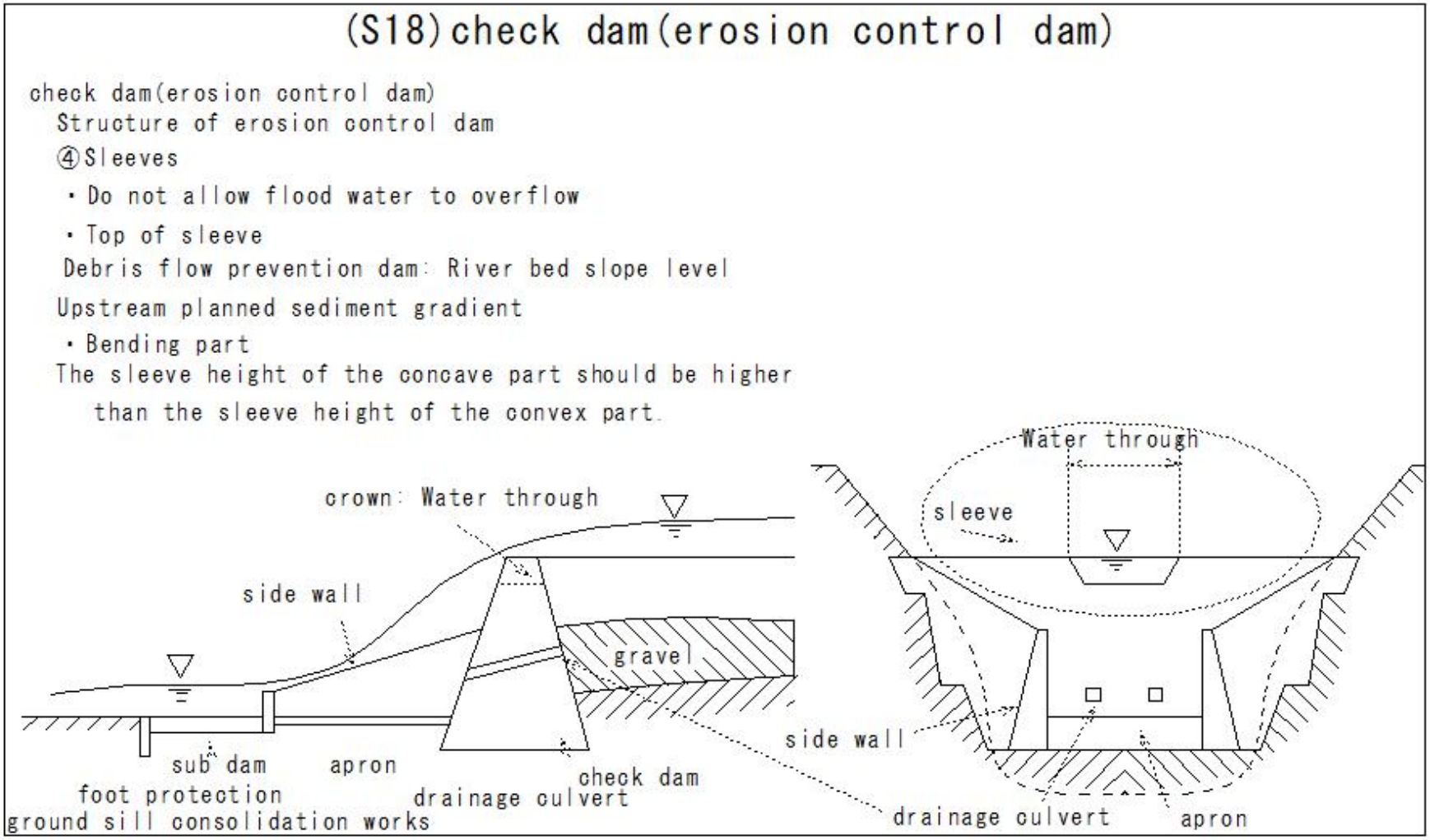
・Top of sleeve

Debris flow prevention dam: River bed slope level

Upstream planned sediment gradient

・Bending part

The sleeve height of the concave part should be higher than the sleeve height of the convex part.



(S19)check dam(erosion control dam)

(S19)check dam(erosion control dam)

check dam(erosion control dam)

Structure of erosion control dam

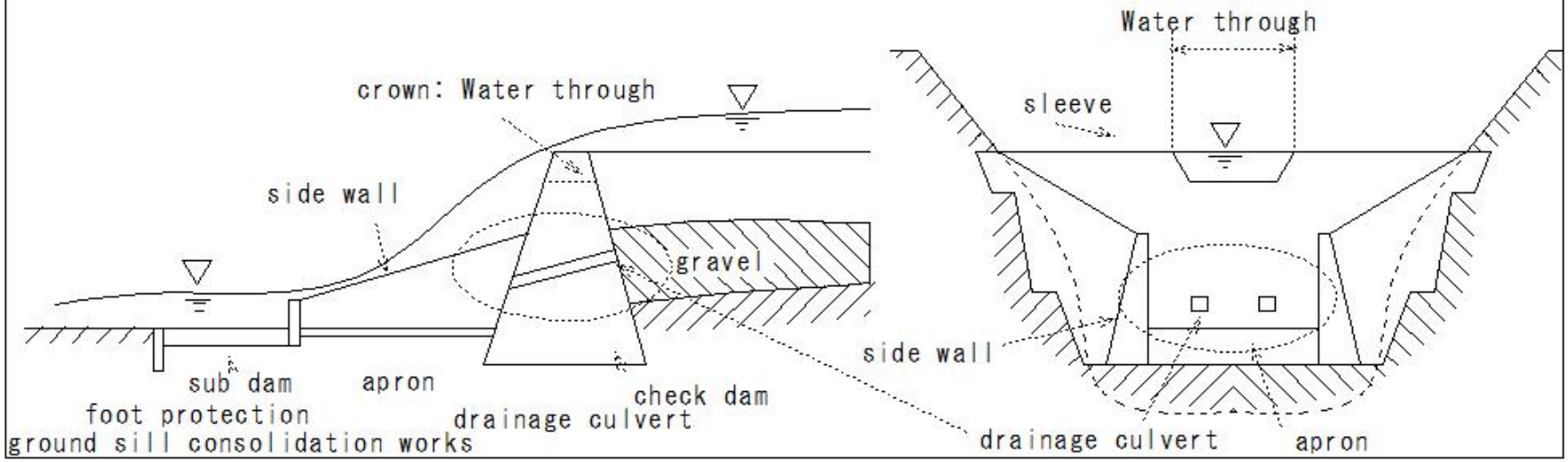
⑤Drainage culvert

・Switch the running water during construction

・After deposition, remove seepage water to reduce soil pressure

・Size, number, shape, and position of drains

Considering flood discharge, quicksand amount, etc.



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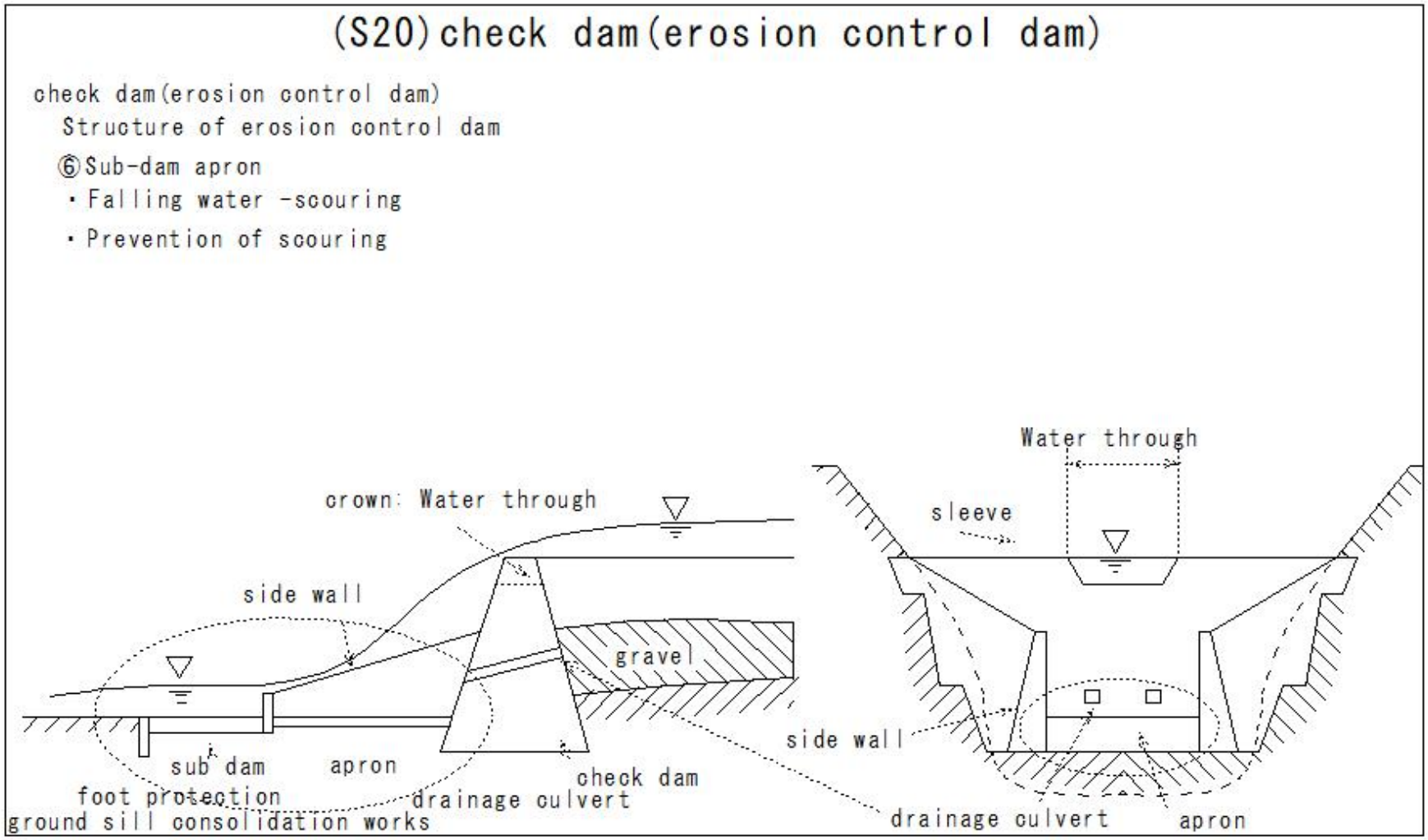
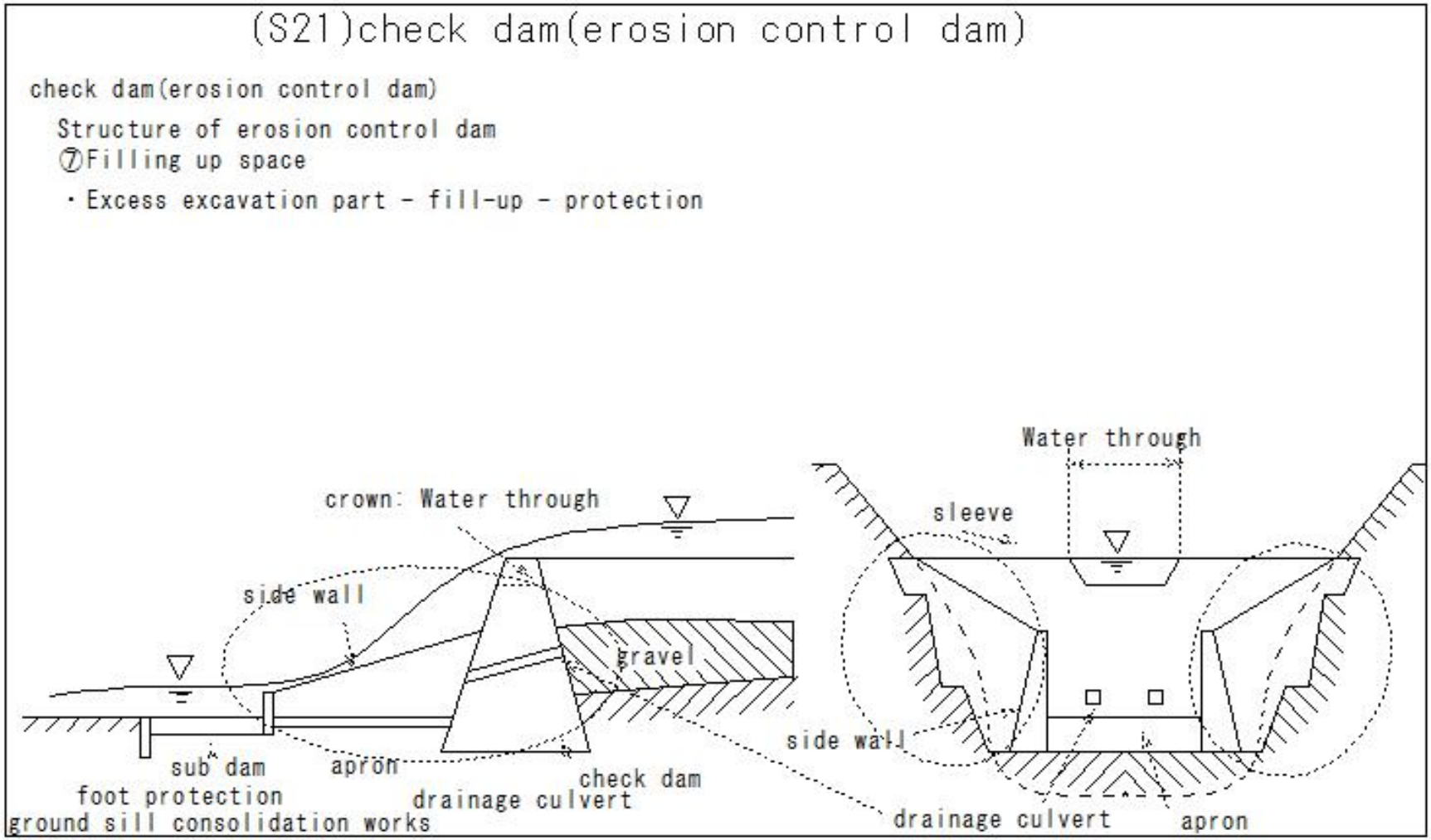


(S21)check dam(erosion control dam)



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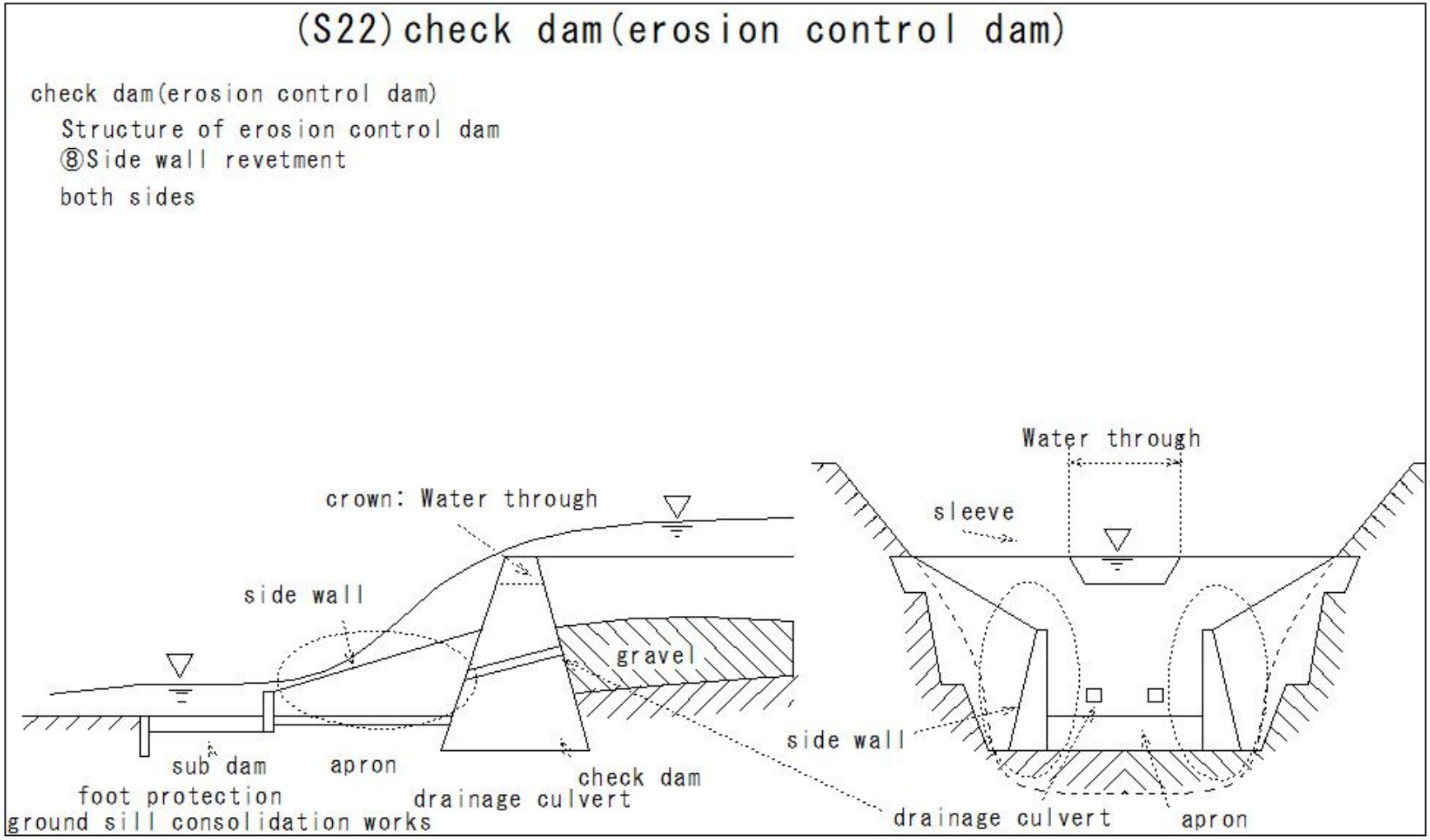
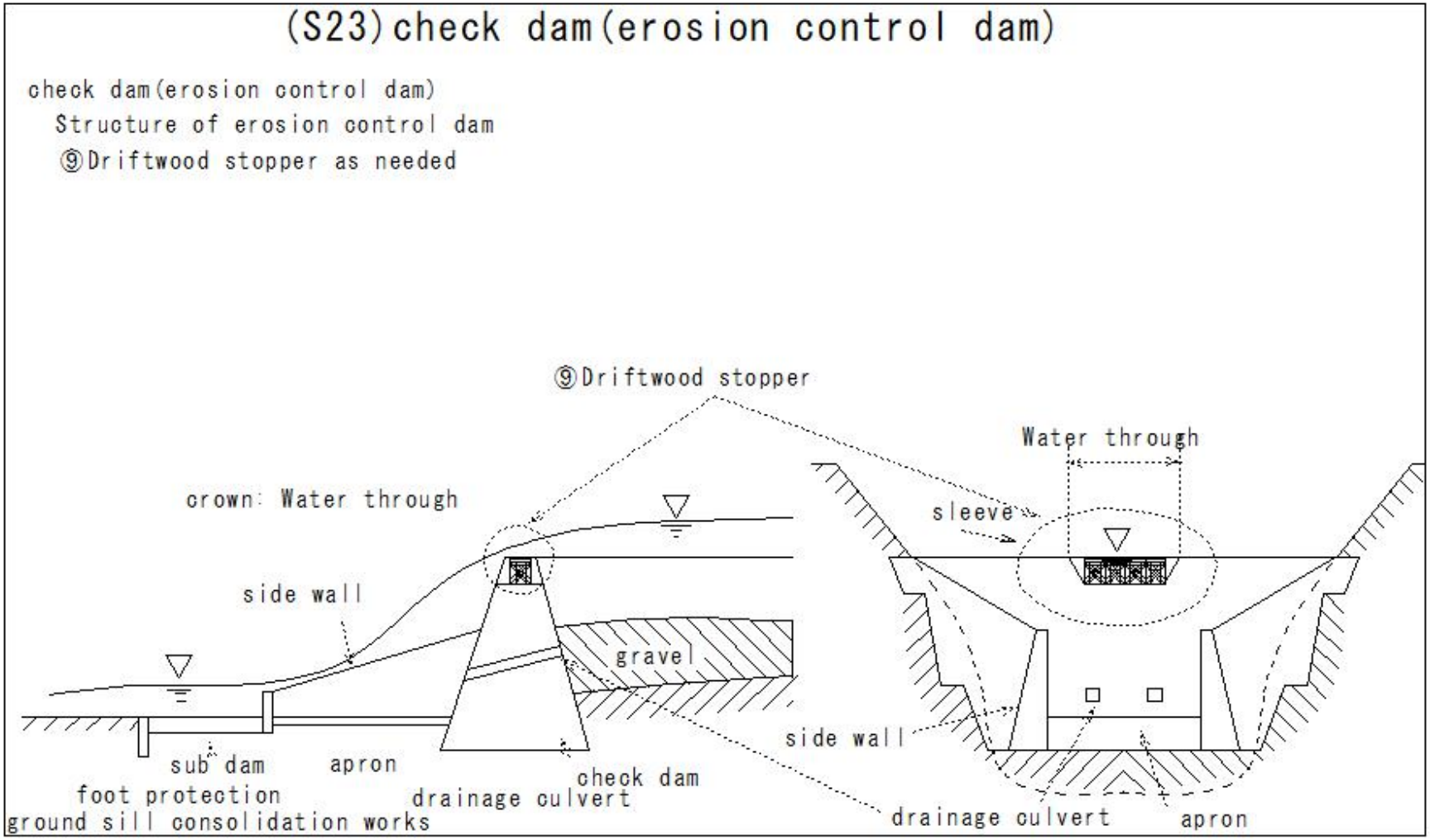
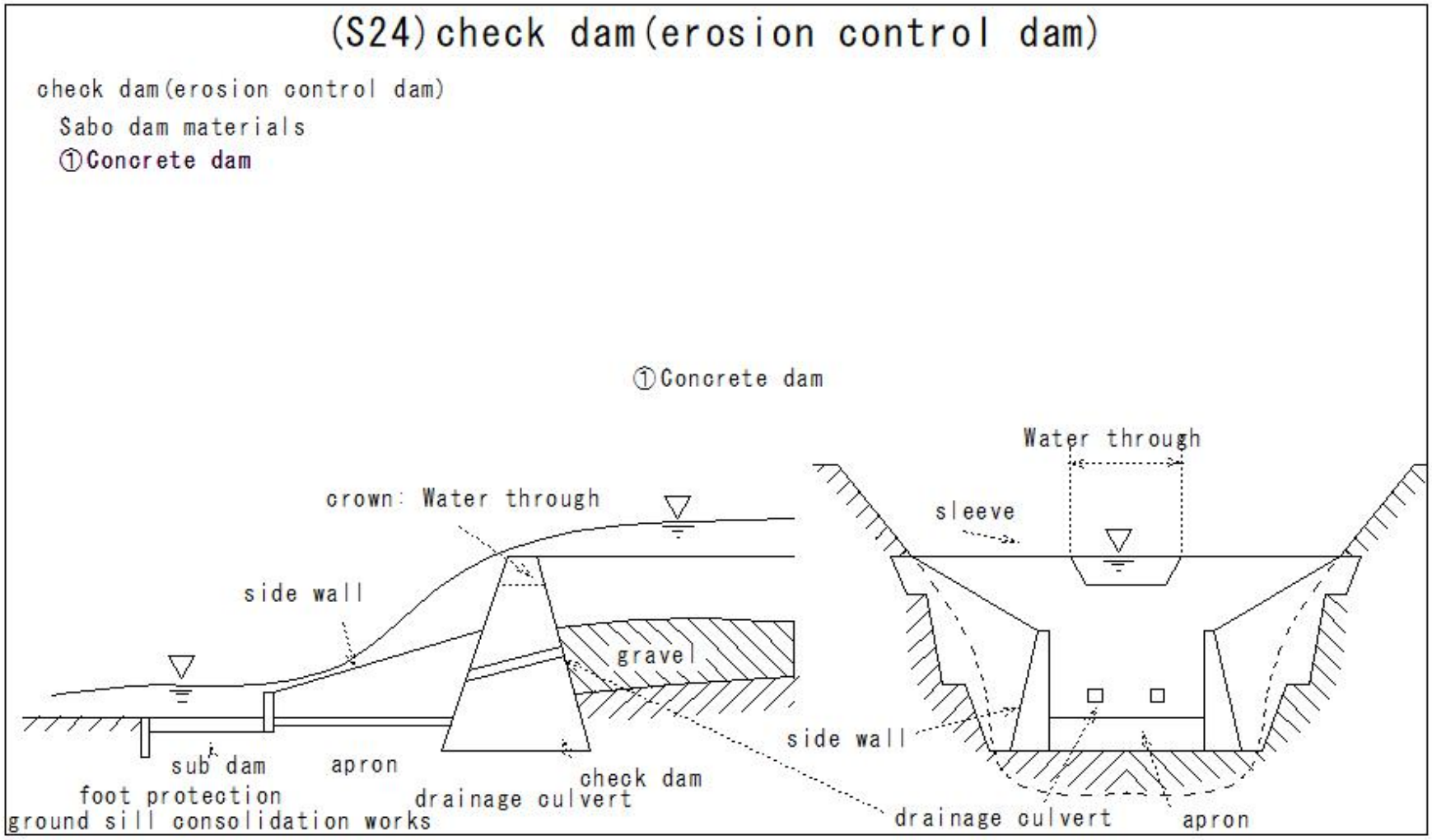


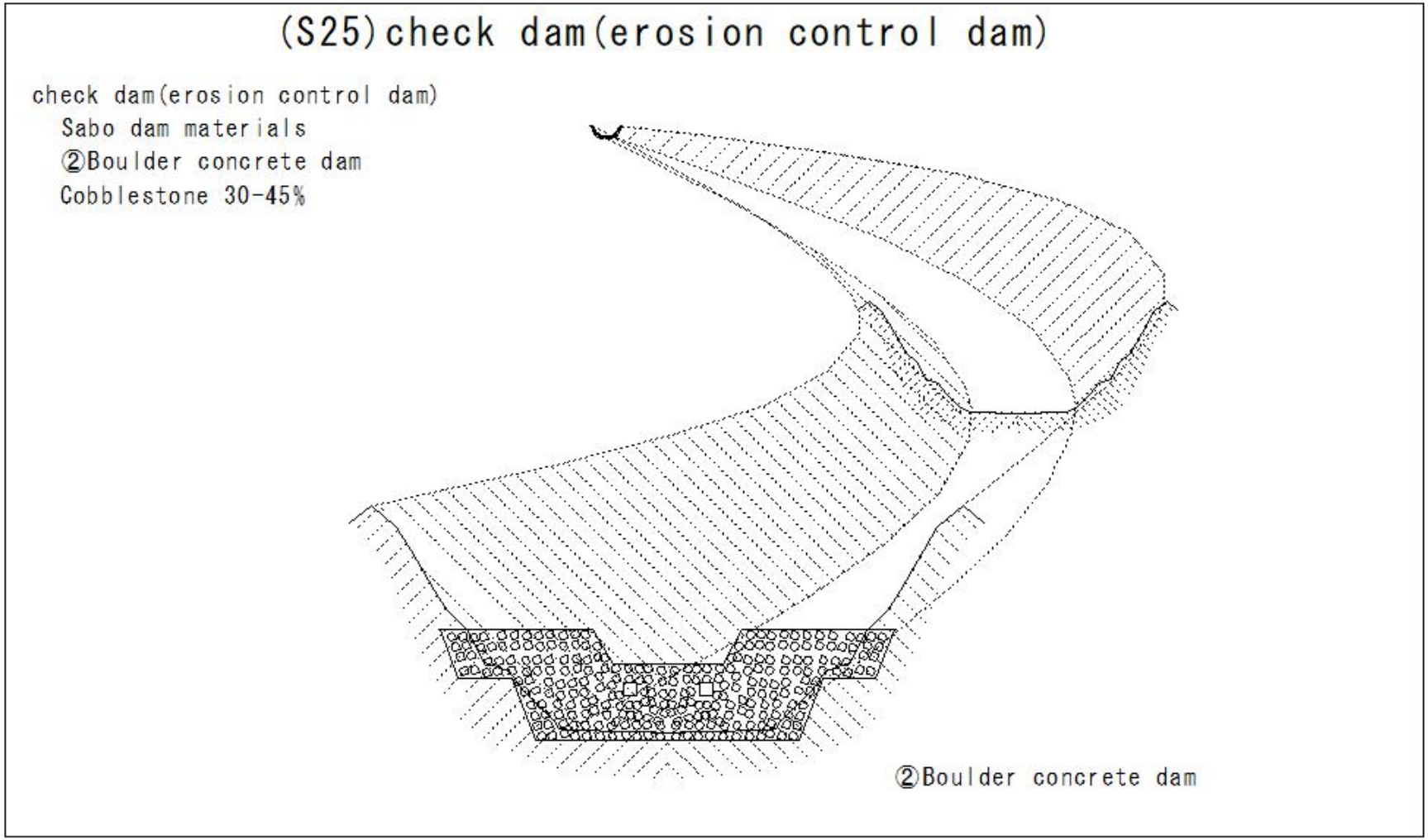
(S23)check dam(erosion control dam)



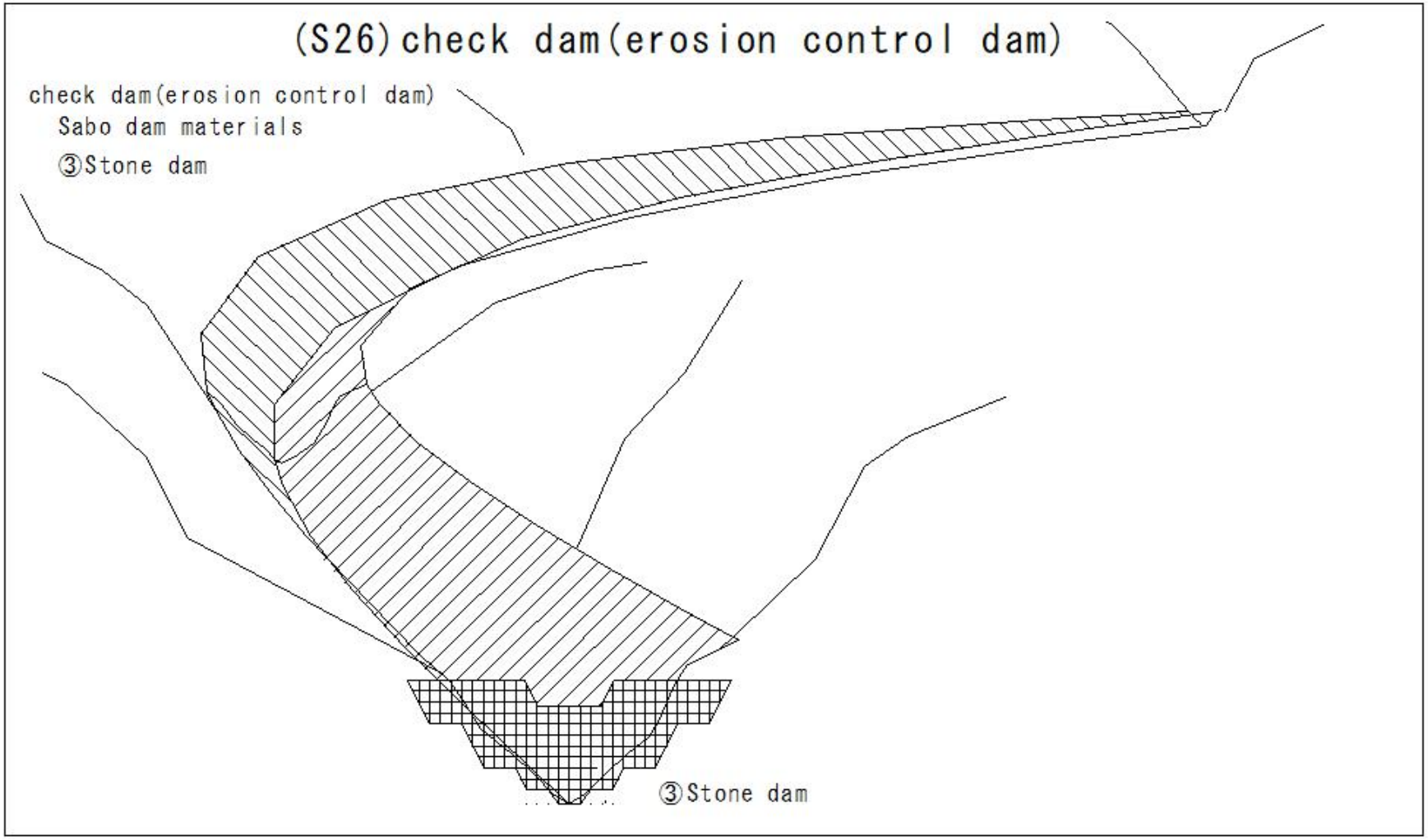
(S24)check dam(erosion control dam)



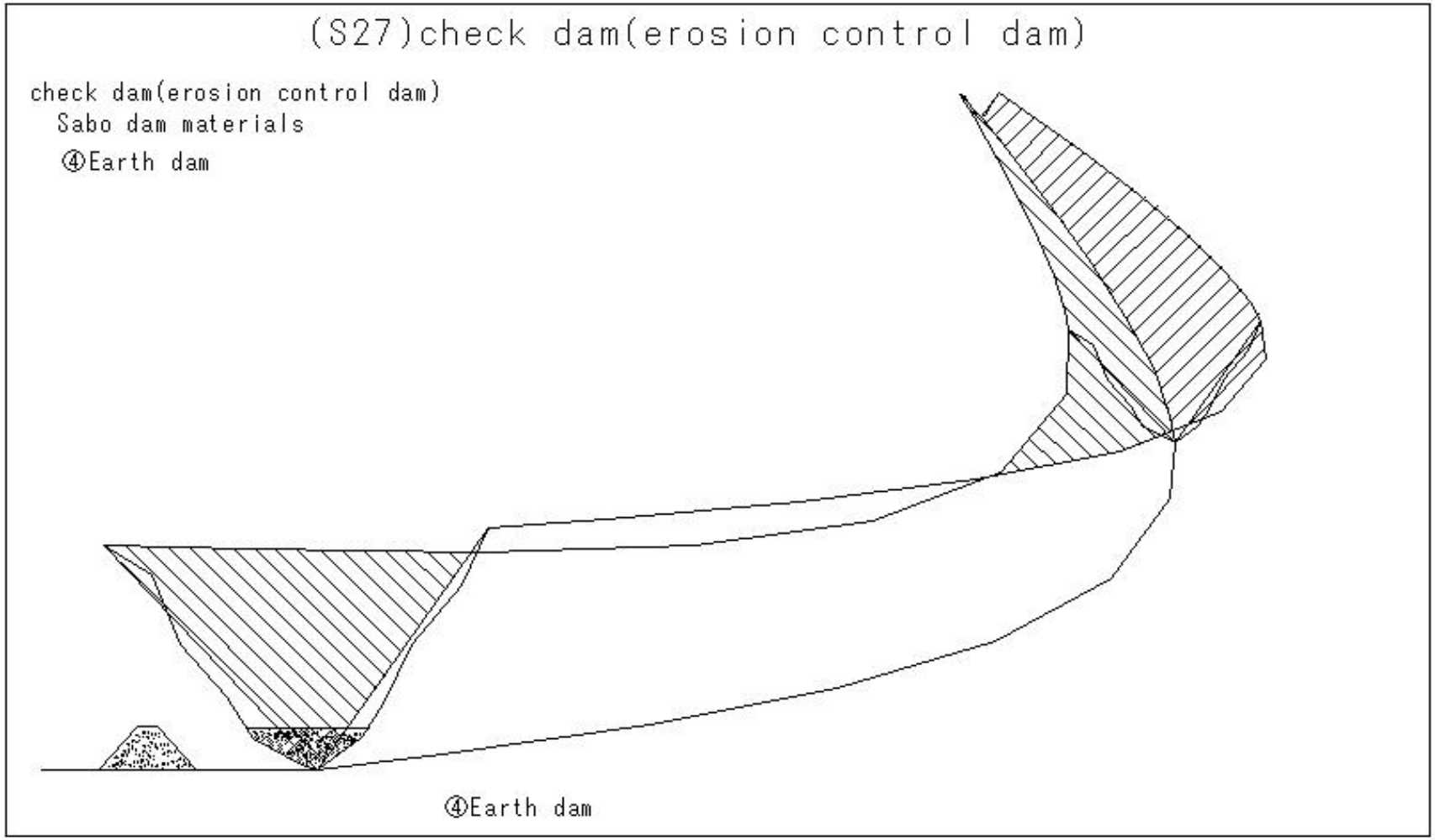
(S25)check dam(erosion control dam)



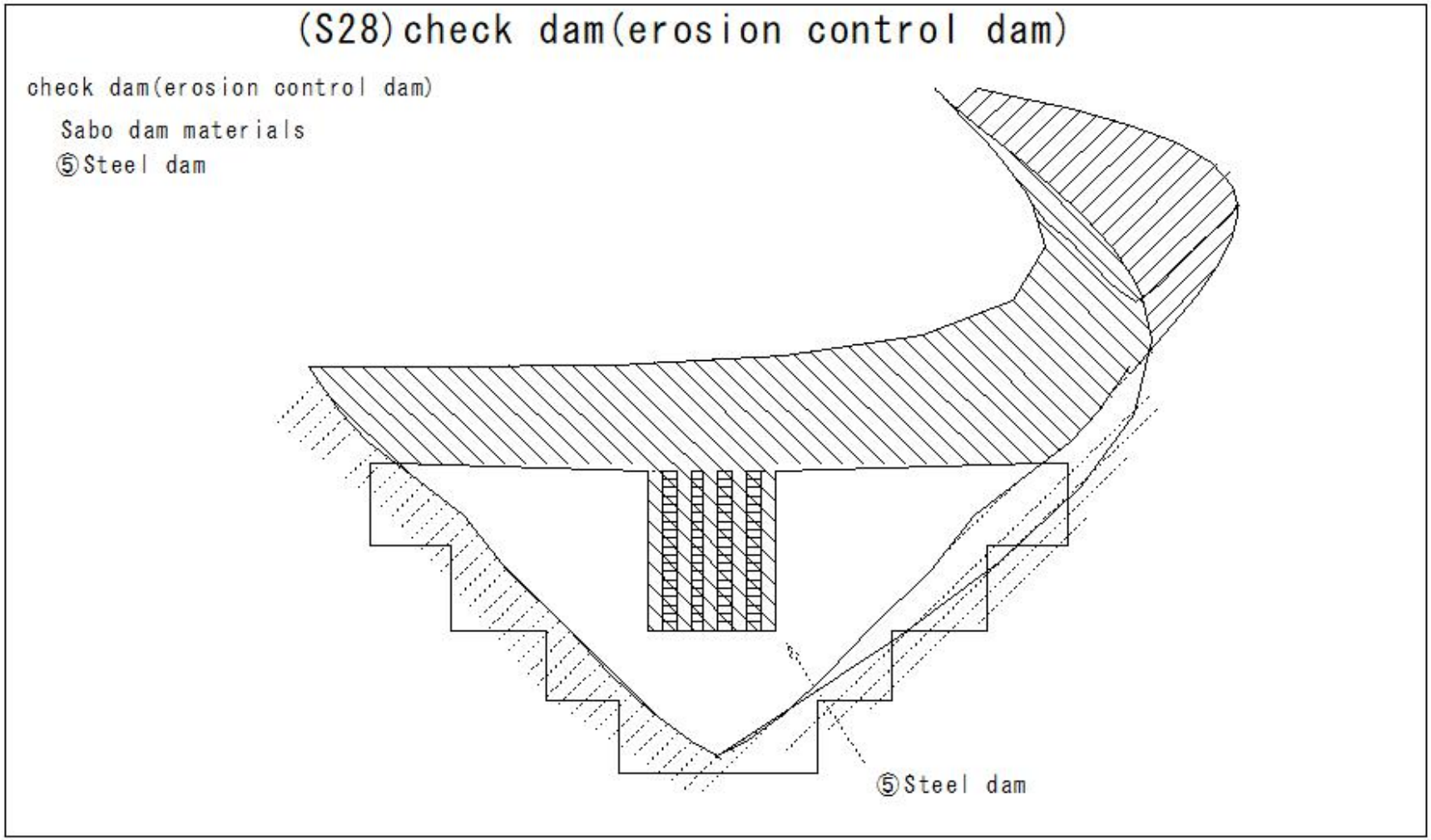
(S26)check dam(erosion control dam)



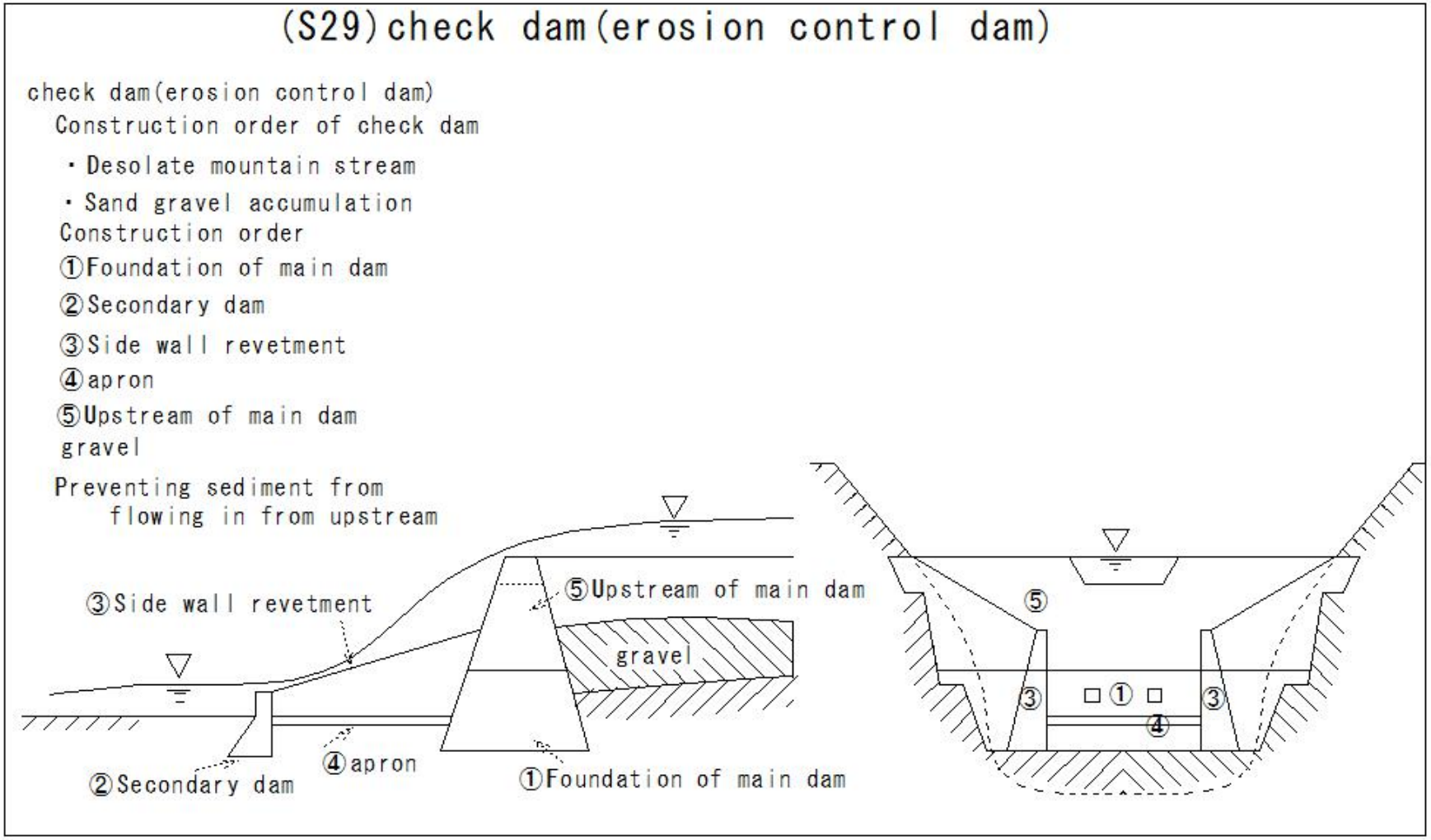
(S27)check dam(erosion control dam)



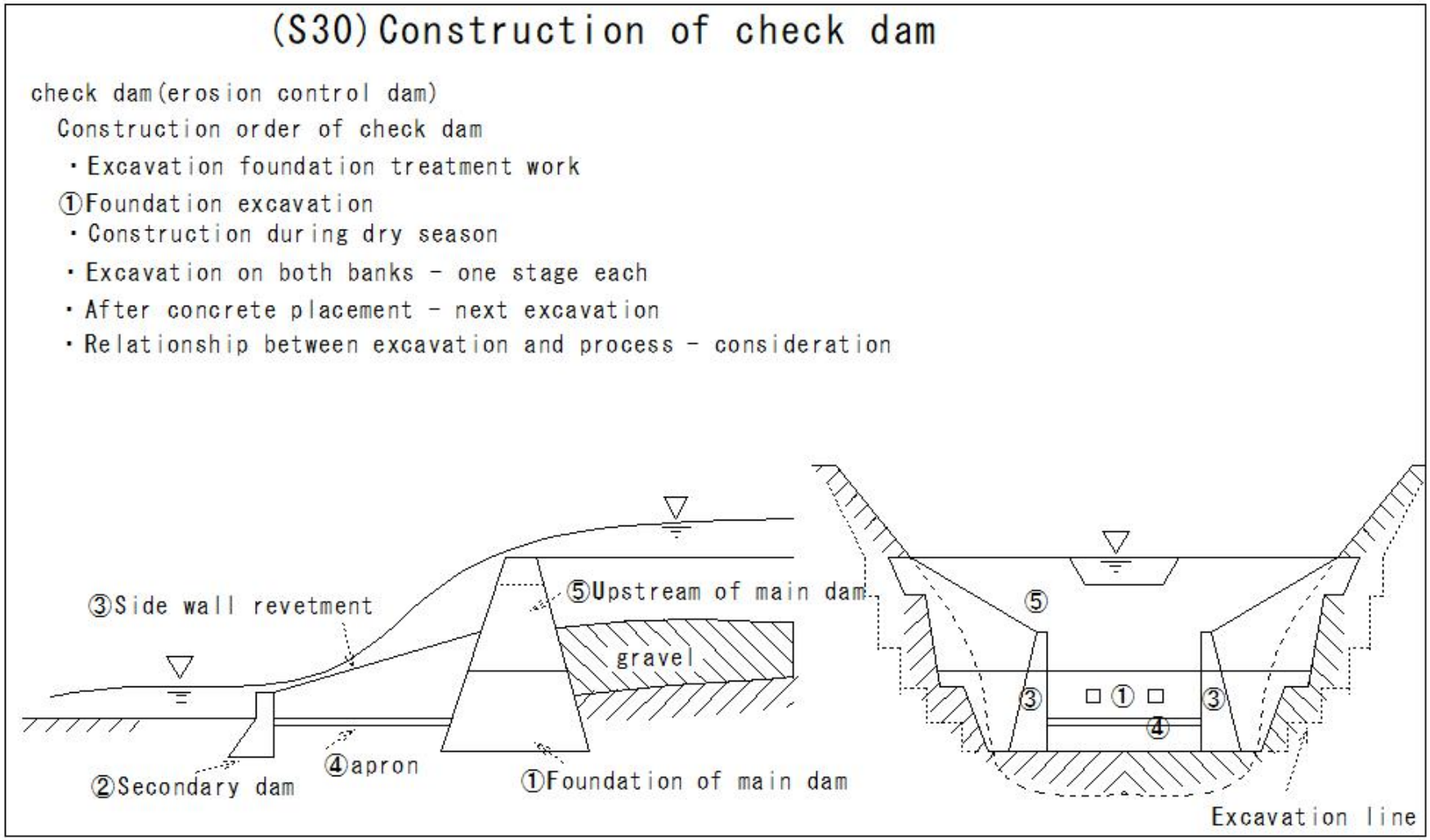
(S28)check dam(erosion control dam)



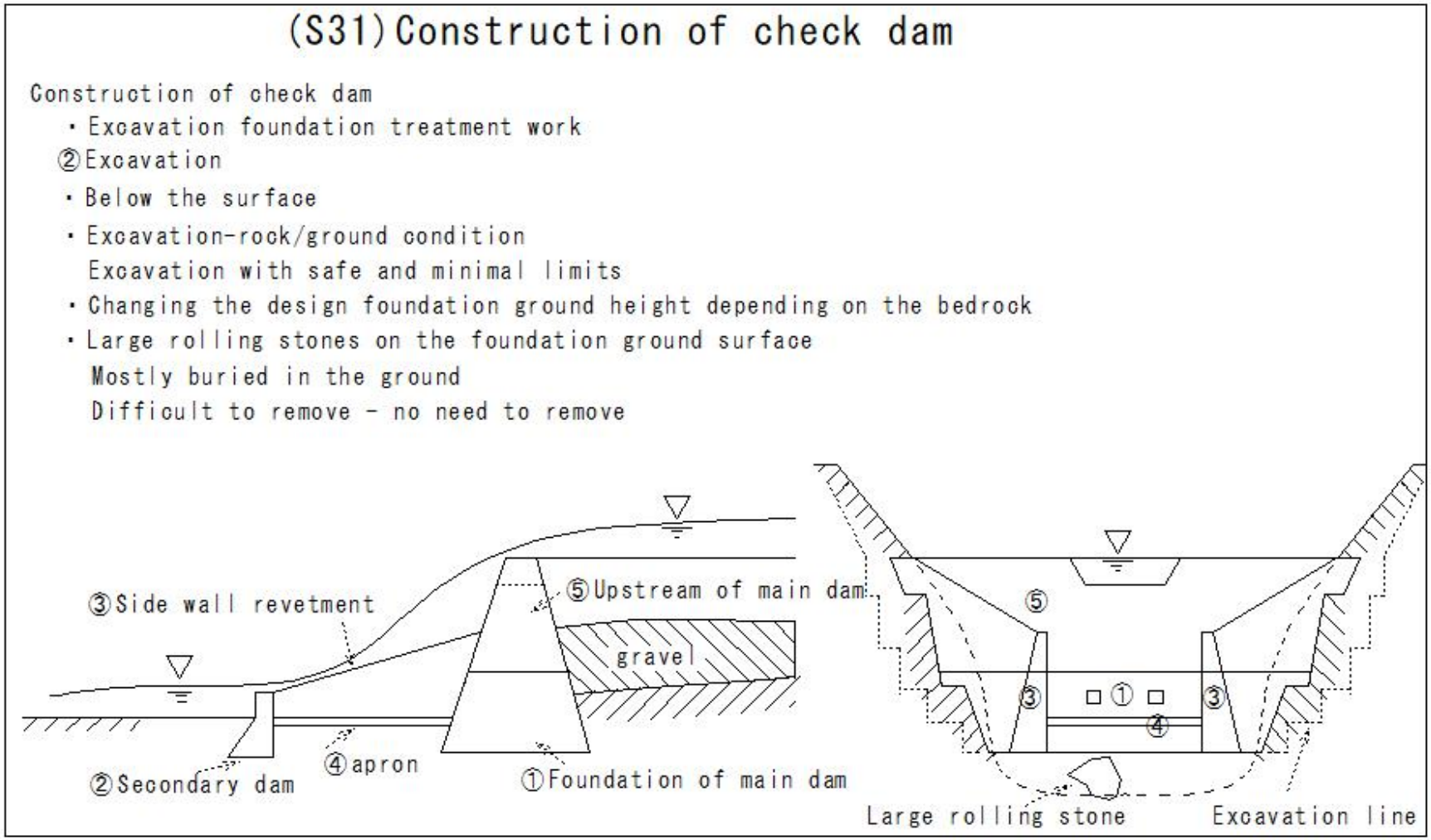
(S29)check dam(erosion control dam)



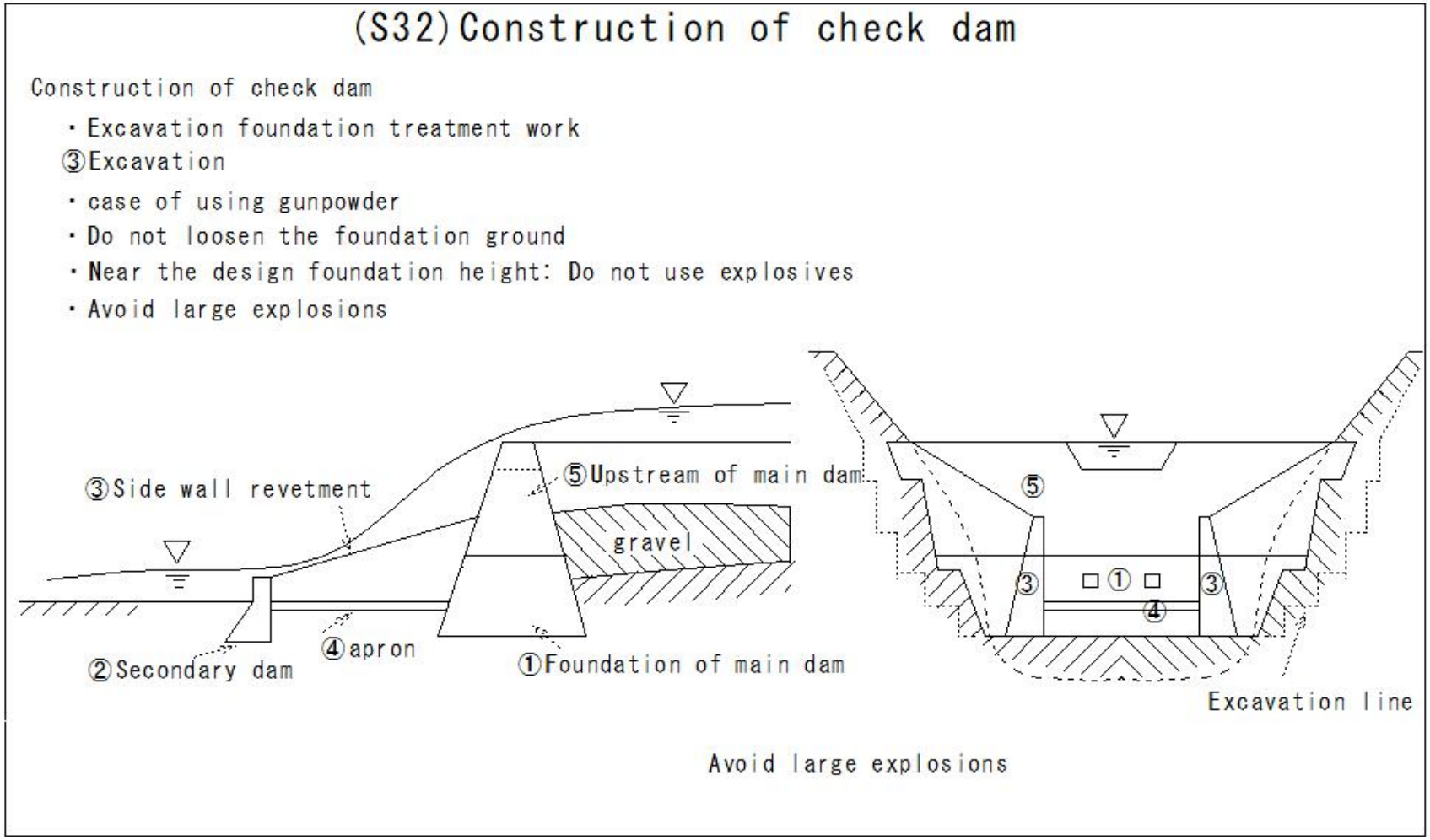
(S30)Construction of check dam



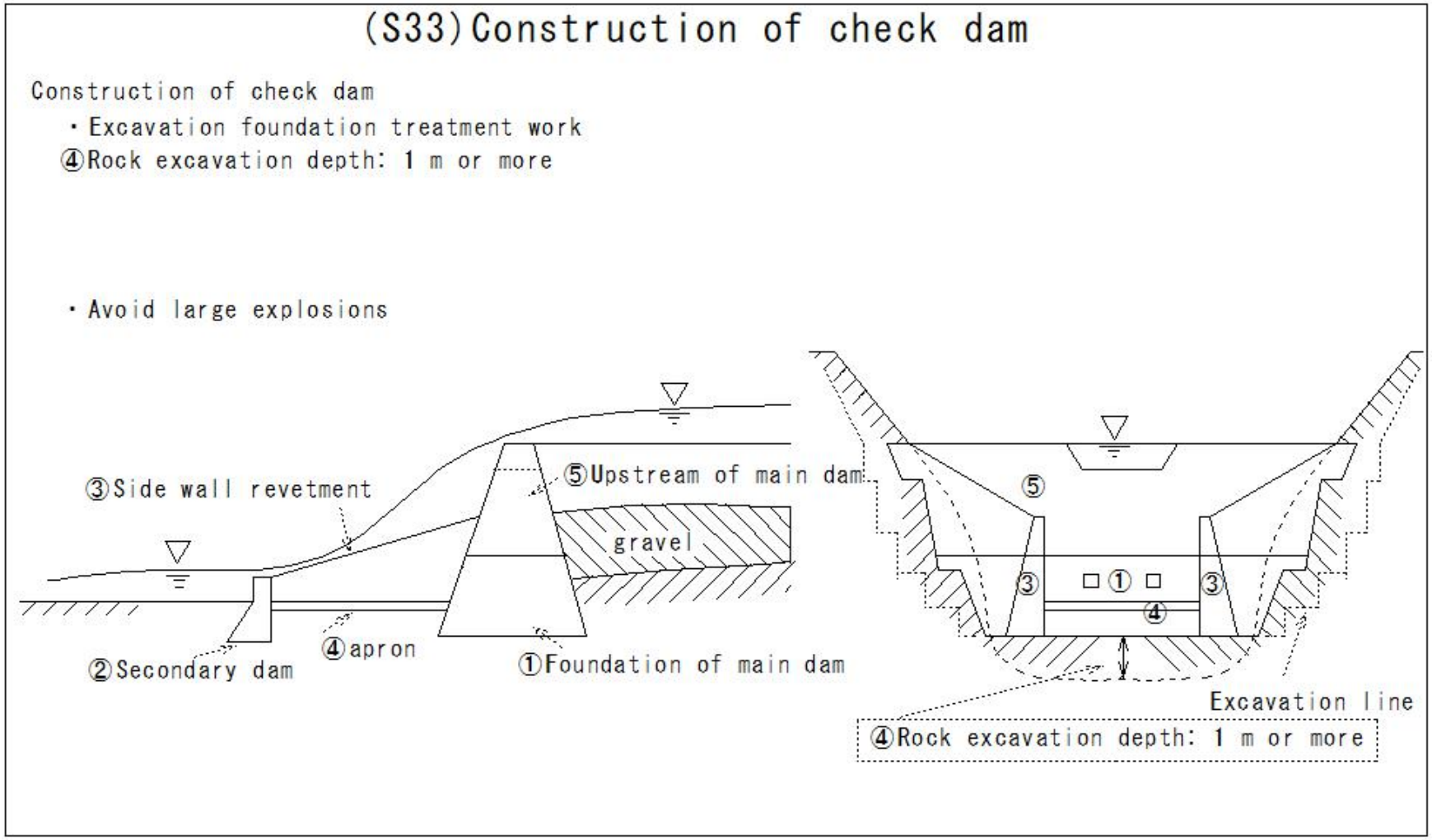
(S31)Construction of check dam



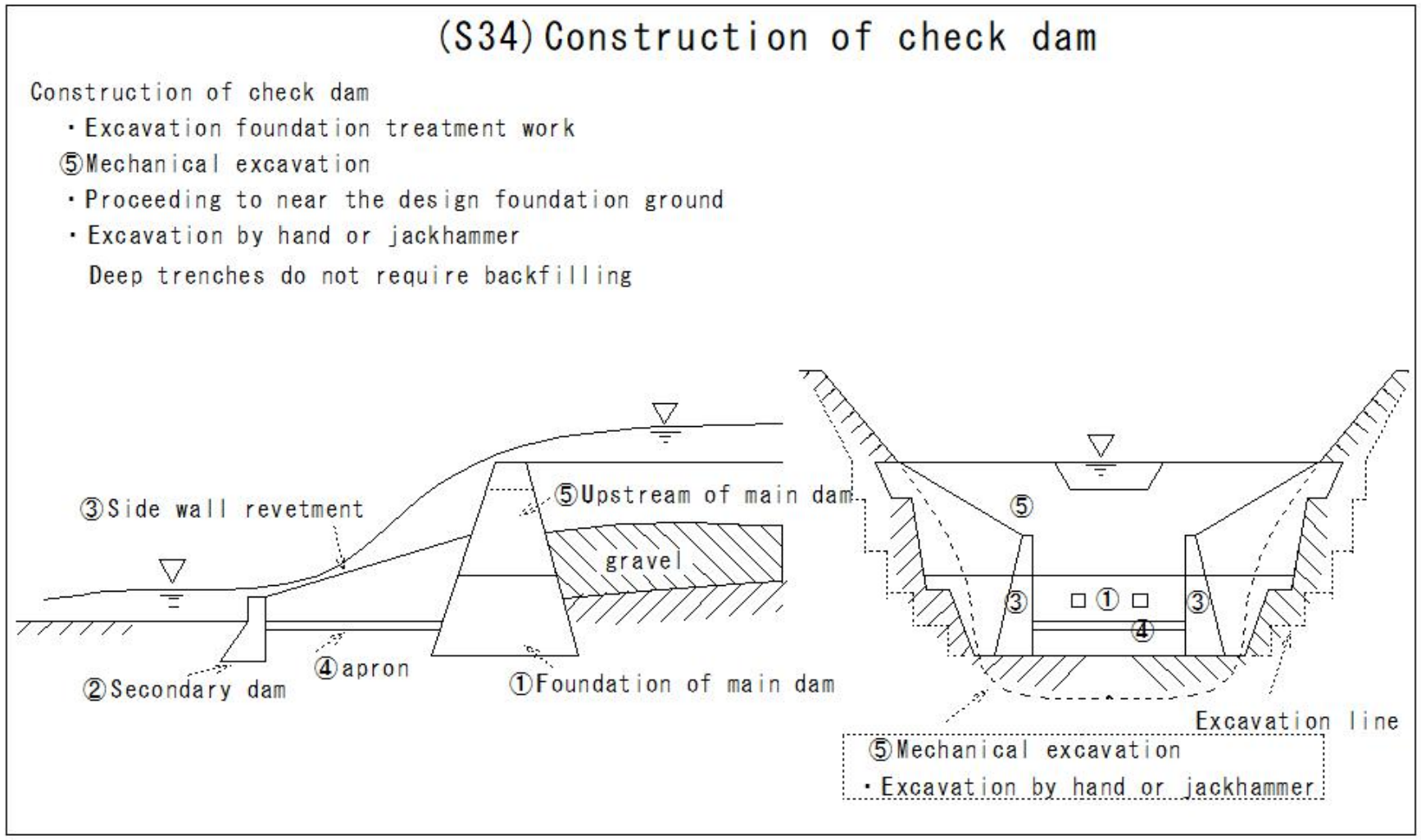
(S32)Construction of check dam



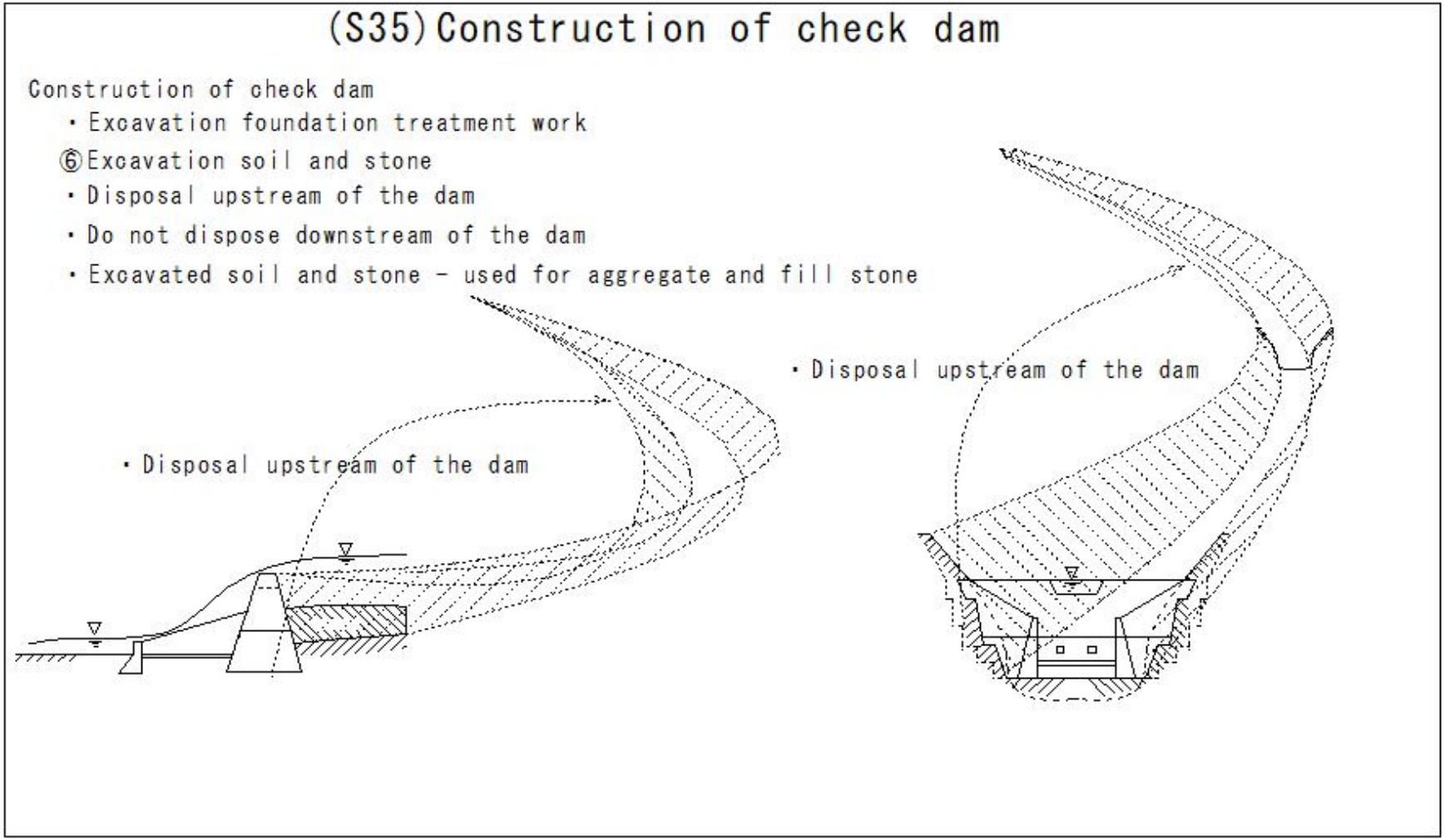
(S33)Construction of check dam



(S34)Construction of check dam



(S35)Construction of check dam



(S36)Construction of check dam

(S36)Construction of check dam

Construction of check dam

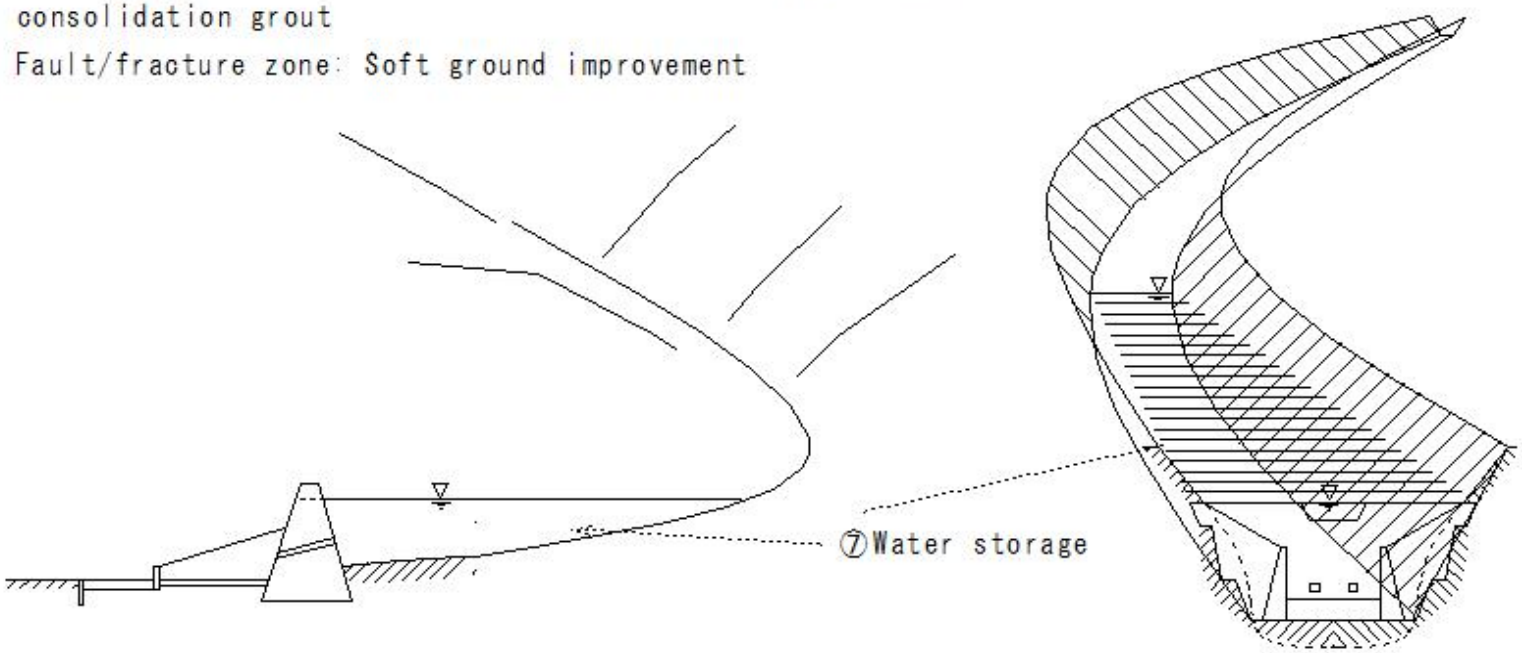
- Excavation foundation treatment work

⑦Water storage

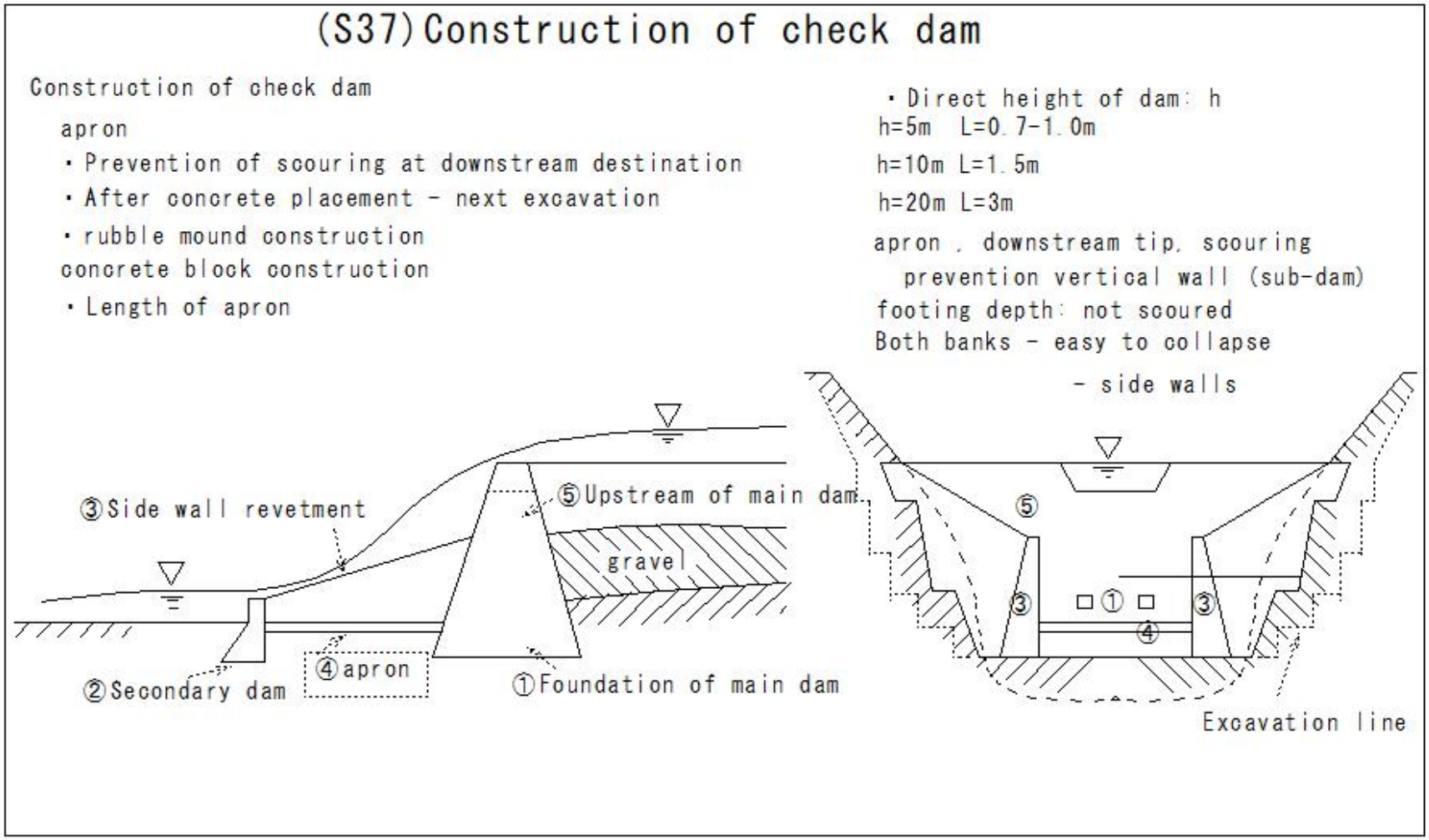
- Not intended for water storage
- Increasing the size - for the purpose of water storage

consolidation grout

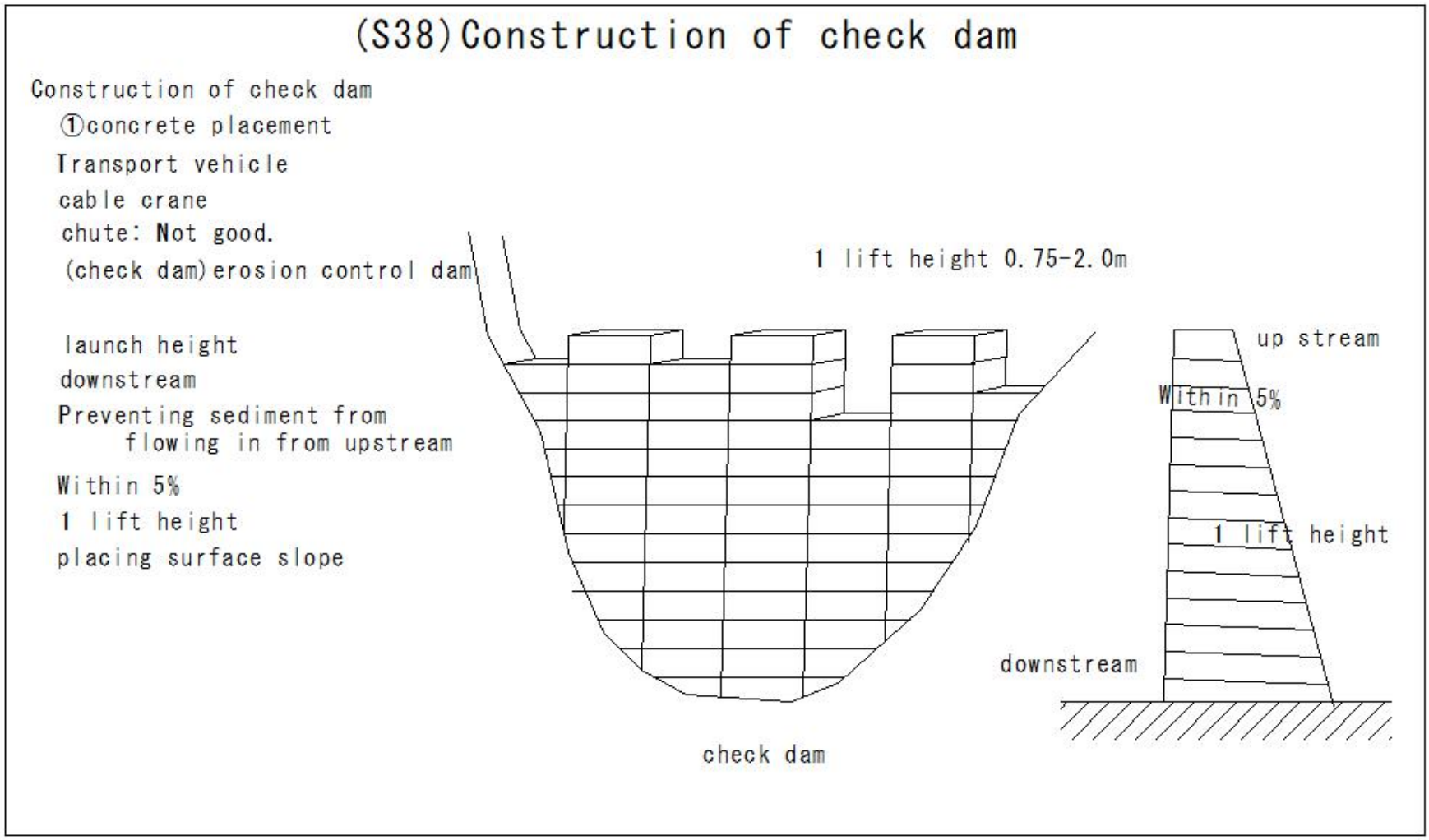
Fault/fracture zone: Soft ground improvement



(S37)Construction of check dam



(S38)Construction of check dam



(S39)Construction of check dam

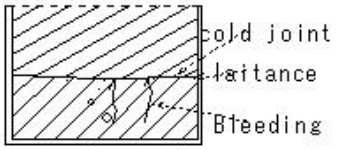
(S39)Construction of check dam

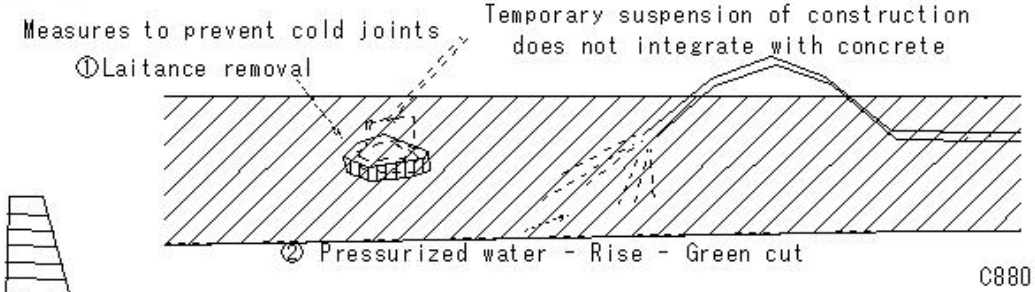
Construction of check dam

concrete placement

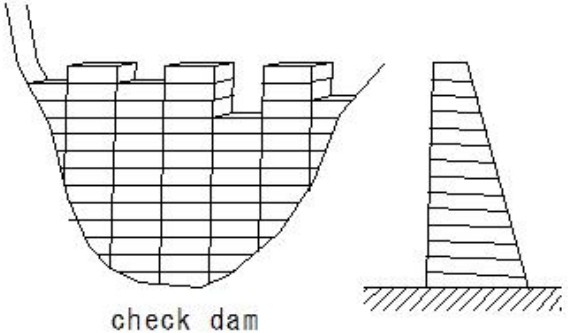
②Before placing, thoroughly clean the new and old rock bed joints.

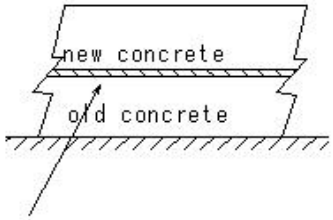
- washing mortar using pressure water, etc.
- Exposing the surface of coarse aggregate
- Lay mortar about 2cm thick
- The standard thickness for new and old concrete casting surfaces is 1.5 cm.





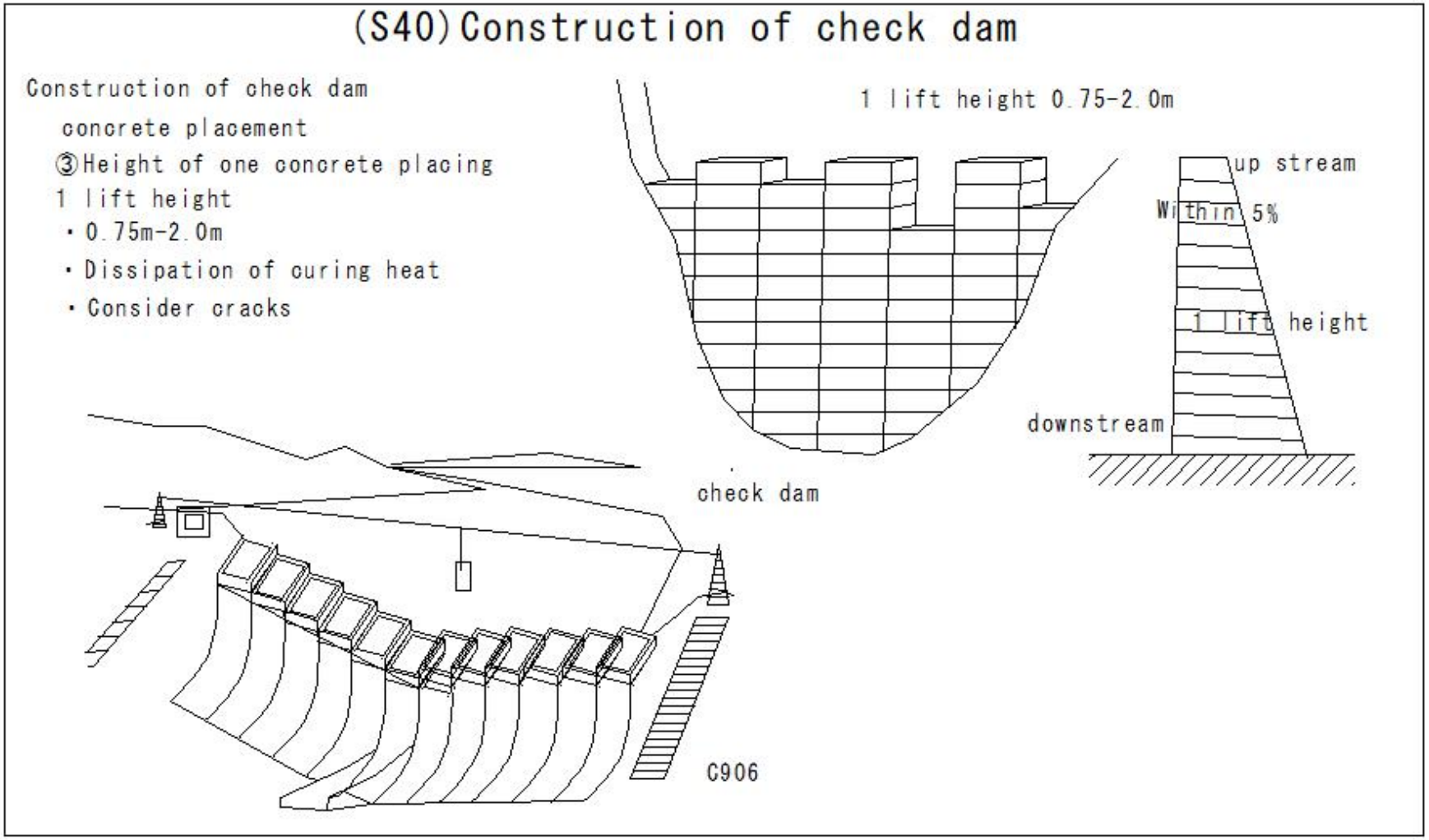
C880





C1410

(S40)Construction of check dam



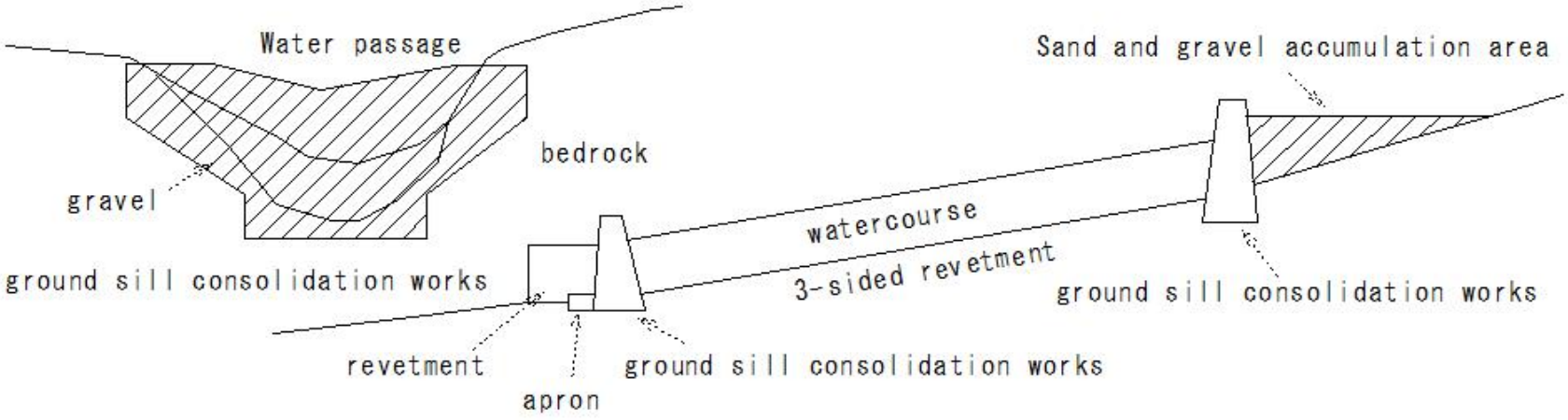
(S41)watercourse

(S41)watercourse

watercourse
ground sill consolidation works
sediment accumulation
watercourse
3-sided revetment
apron , downstream tip, scouring prevention
vertical wall (sub-dam)

Water passage width Minimum width 3m
ground sill consolidation works
・Sand and gravel accumulation area
・Vertical and horizontal erosion of running water
・Sediment production

①Vertical regulation of watercourse
②watercourse flatness regulation
③Prevention of collapse revetment on both banks



(S42)watercourse

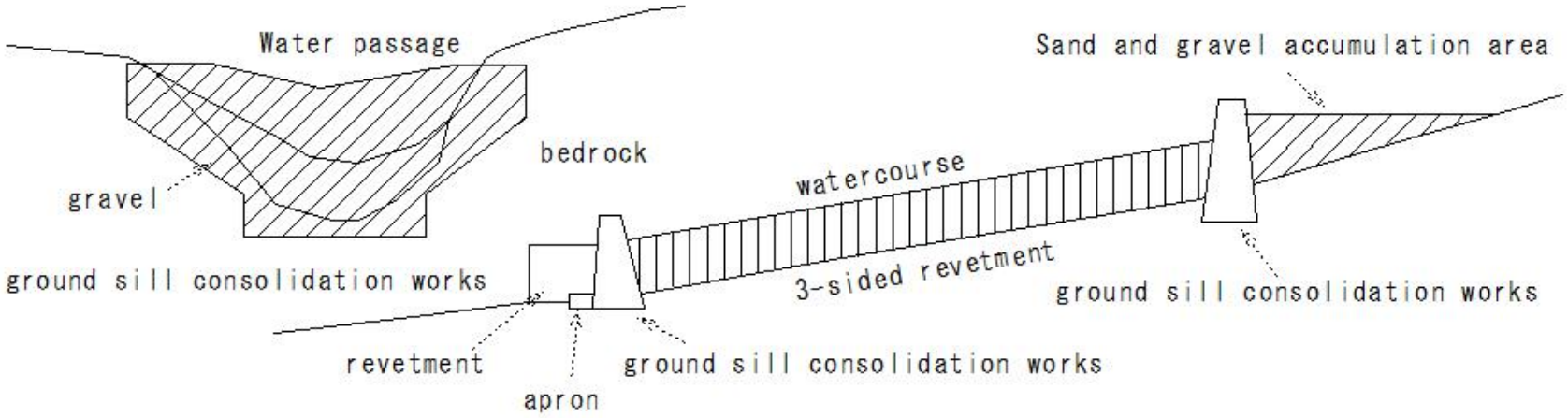
(S42) watercourse

watercourse

structure

①check dam and watercourse

familiarly installed downstream from the secondary dam



(S43)watercourse

(S43)watercourse

watercourse

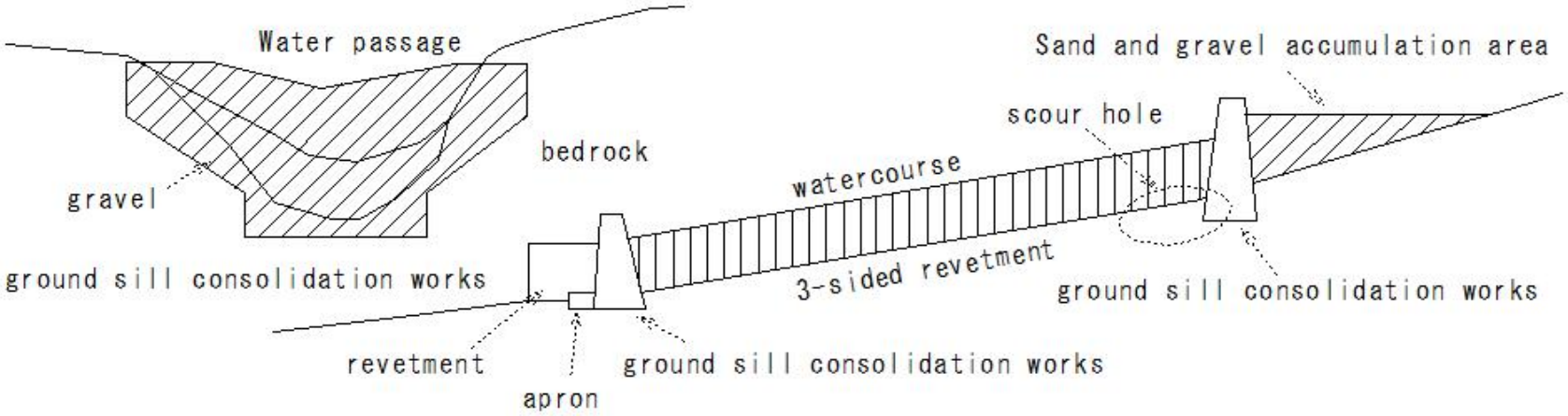
structure

②End treatment of the stretched part

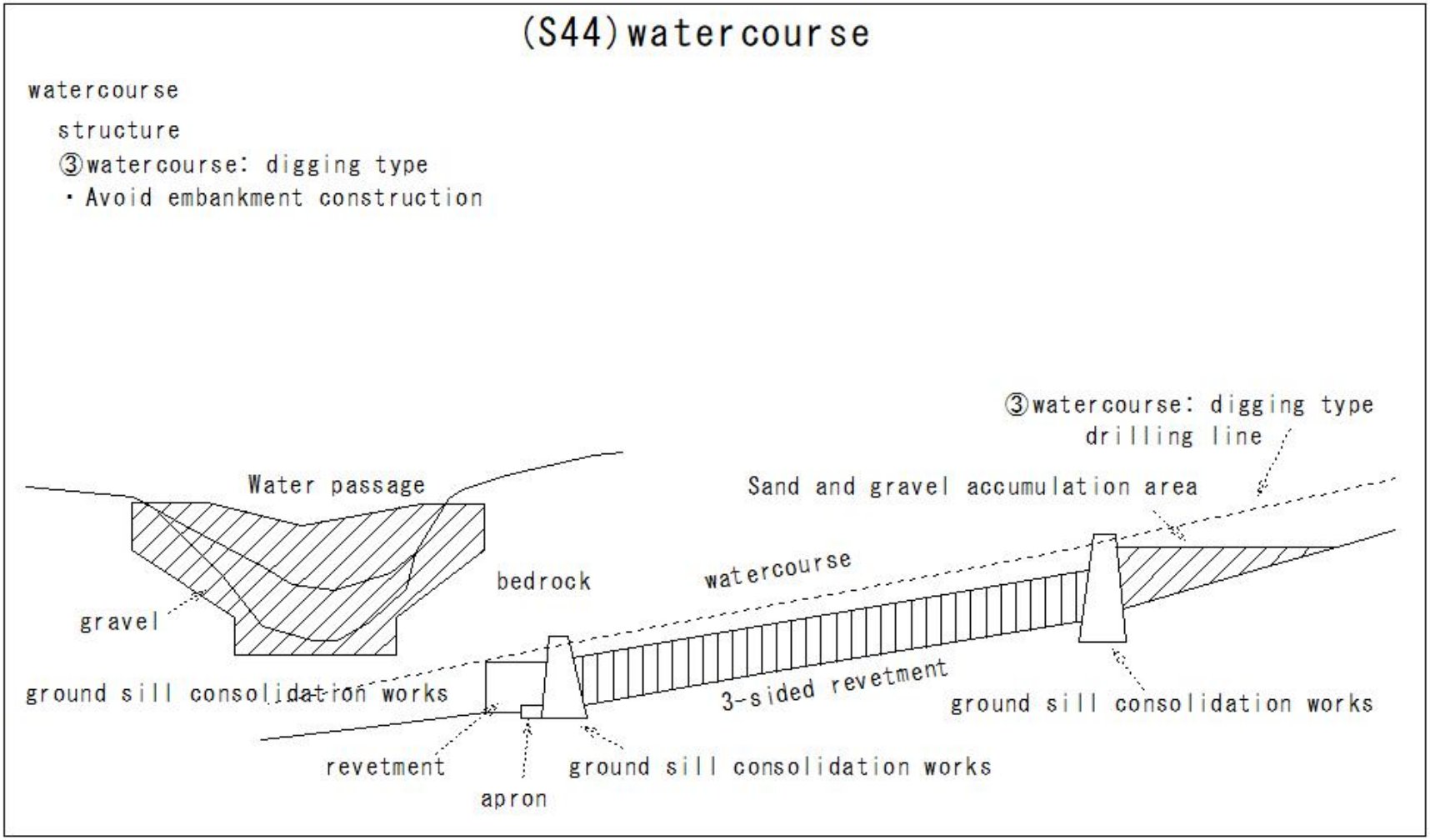
3-sided watercourse construction - 2-sided watercourse construction

・Difference in current velocity - near upstream area, foundation part of revetment - scour hole

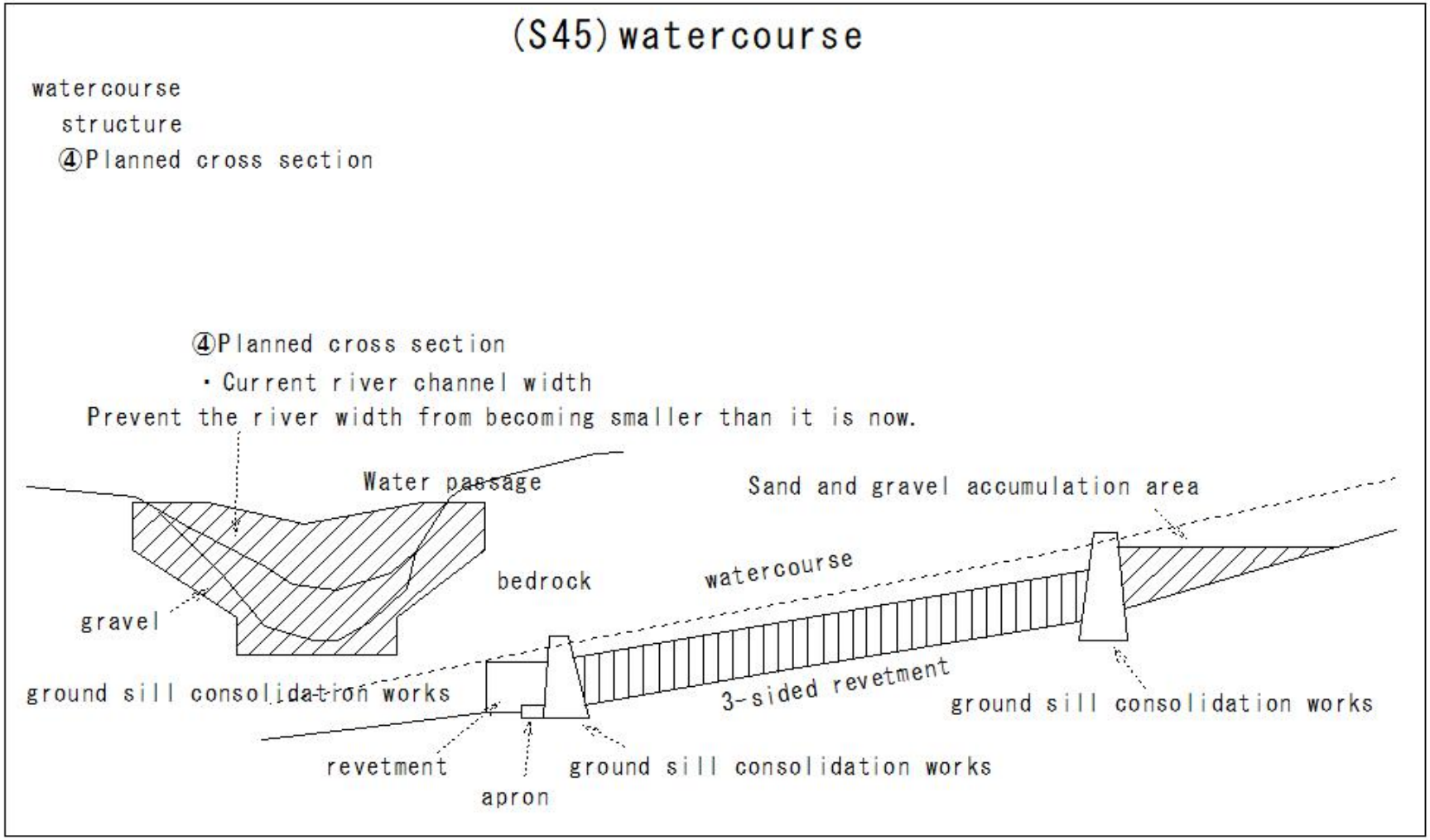
・Bed protection work - Consider energy reduction work



(S44)watercourse



(S45)watercourse

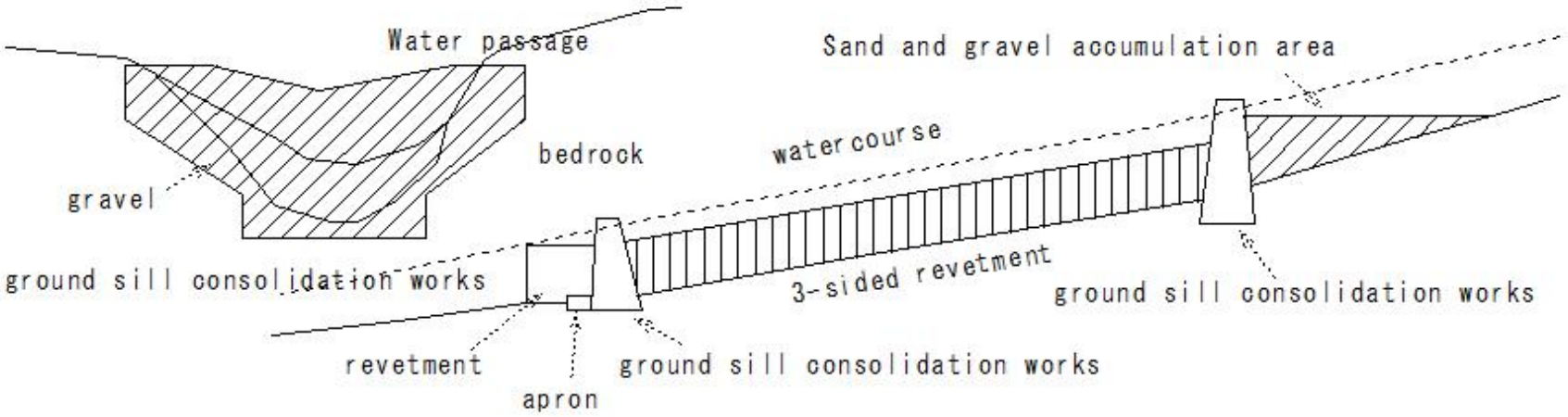


(S46)watercourse

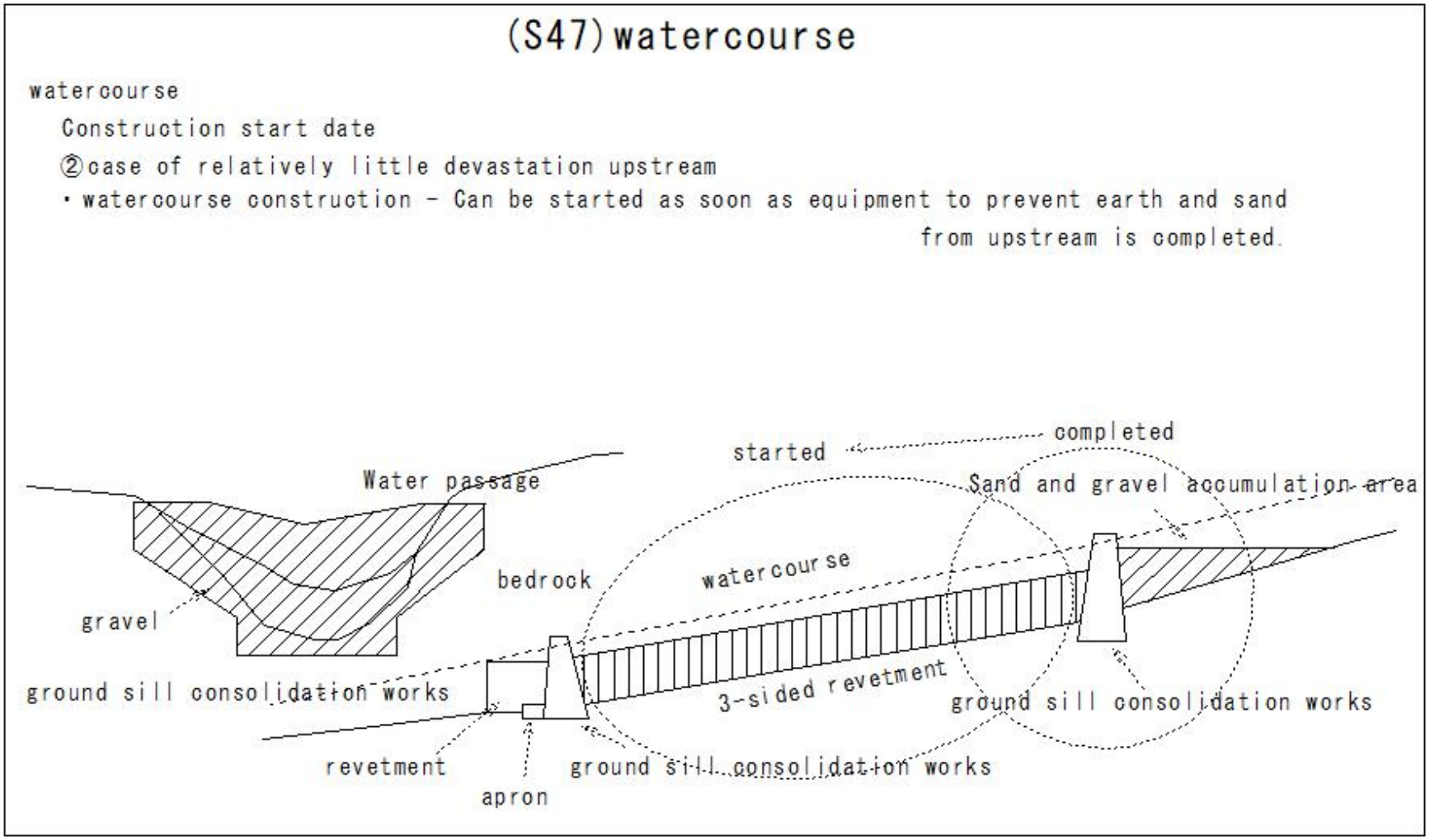
(S46) watercourse

watercourse
Construction start date
Examining the condition of devastation
in the upper reaches of mountain streams
①Upstream area is in ruins
・check dam work has been completed -
watercourse can be carried out

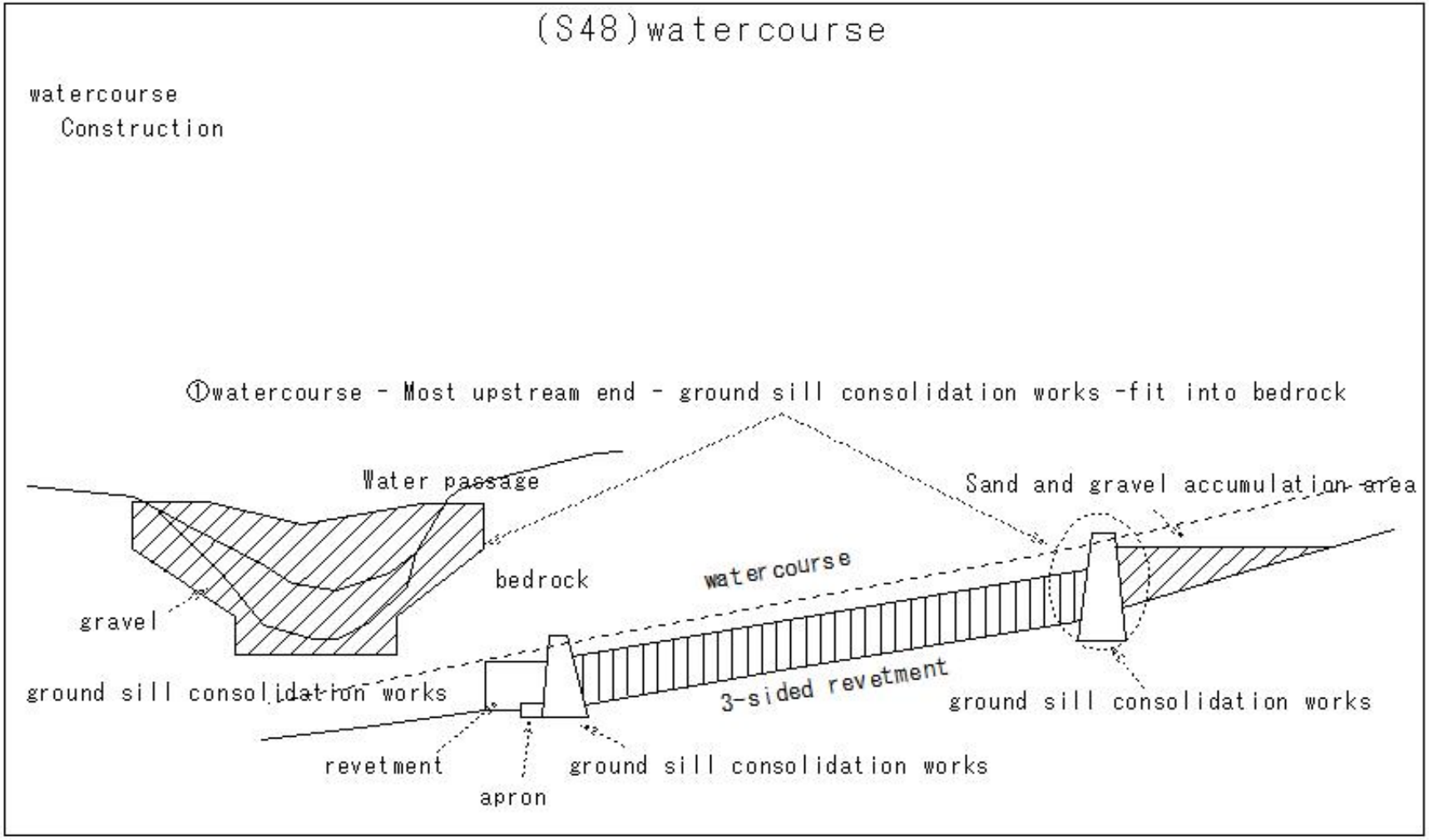
①Upstream area is in ruins



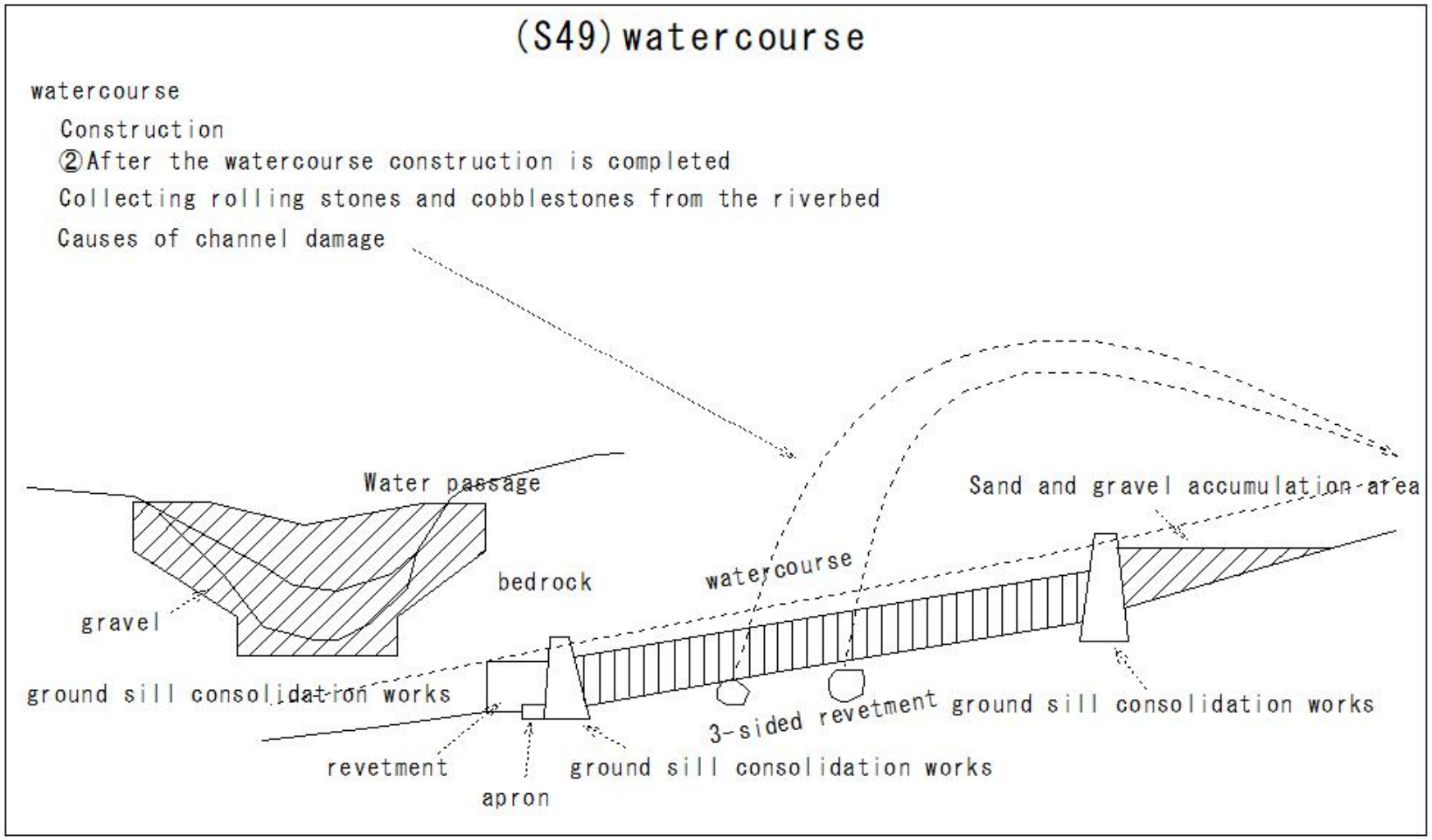
(S47)watercourse



(S48)watercourse



(S49)watercourse



(S50)watercourse

(S50)watercourse

watercourse

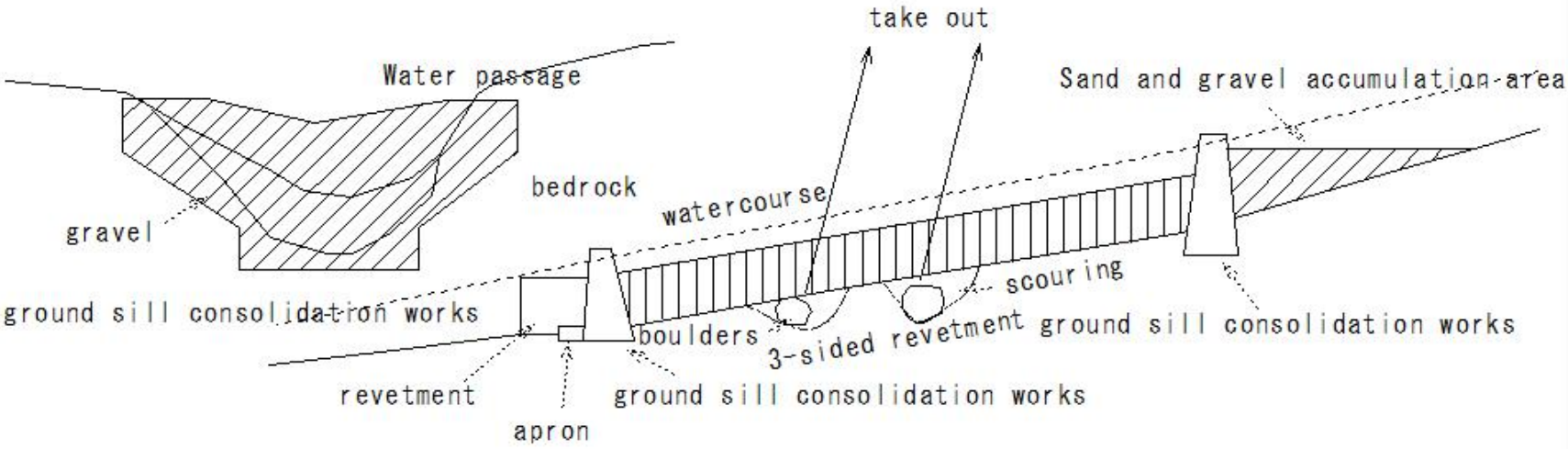
Construction

③case of there are boulders in the watercourse work

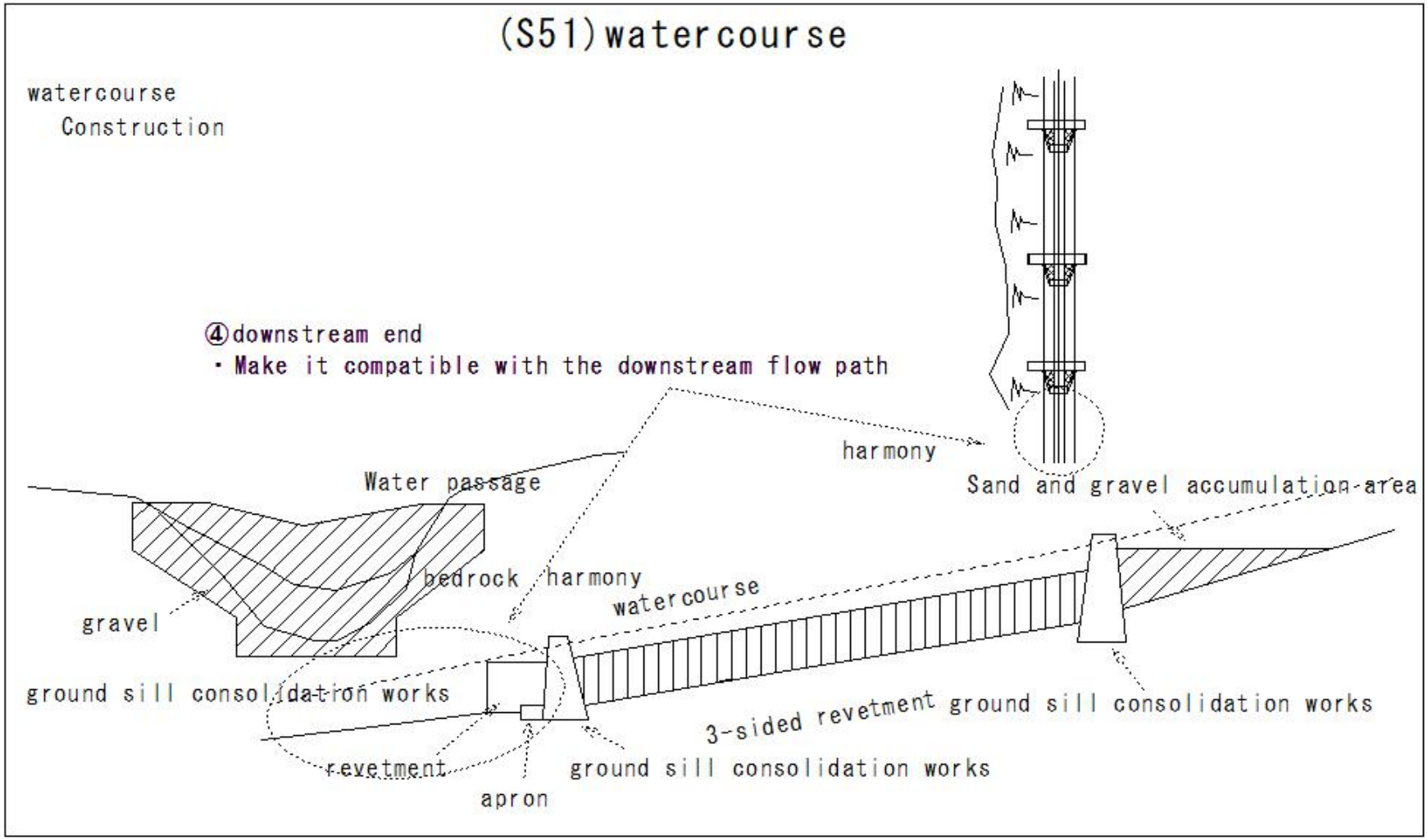
scouring is carried out

Destruction of revetment

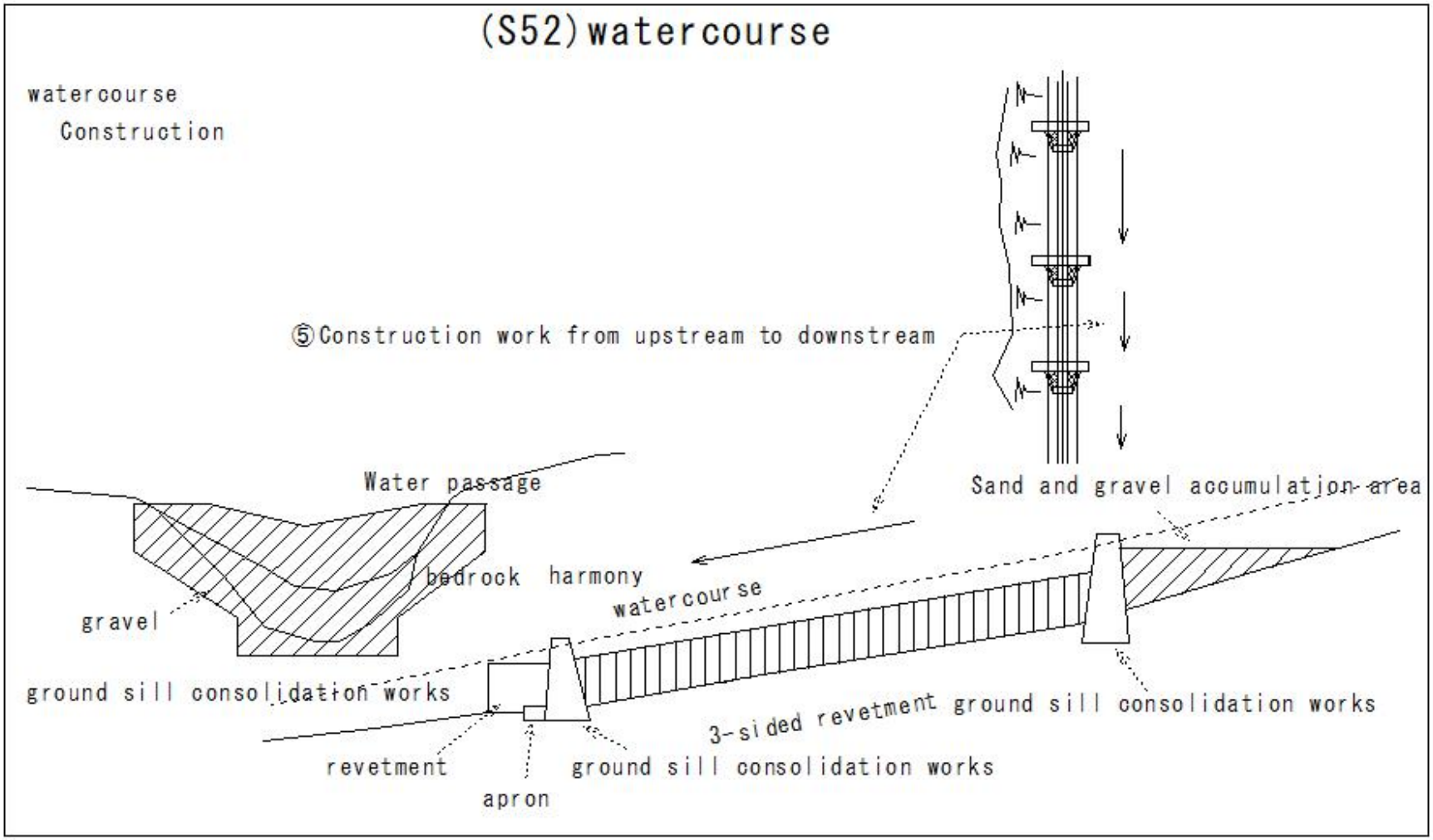
・take out before watercourse construction



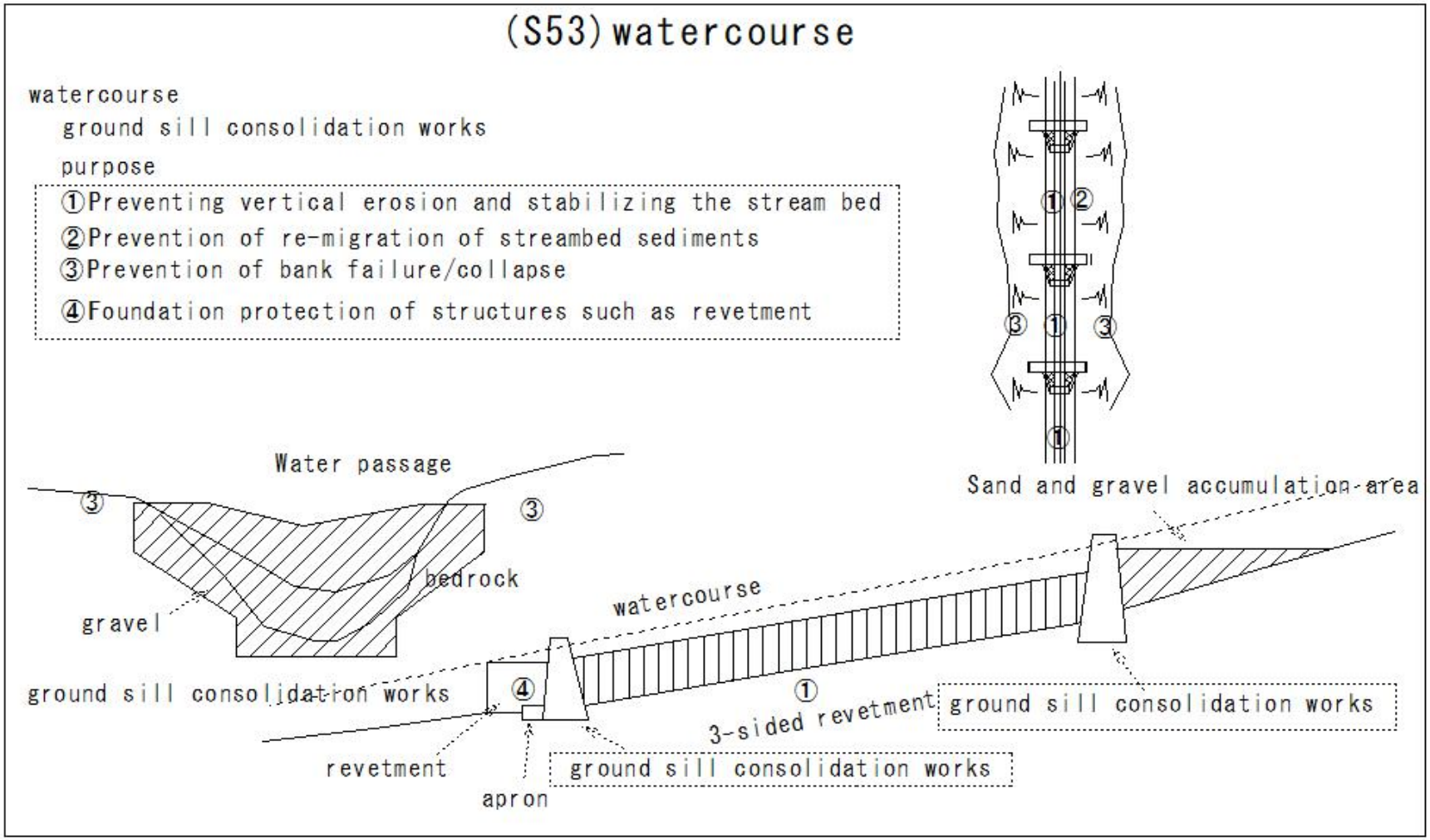
(S51)watercourse



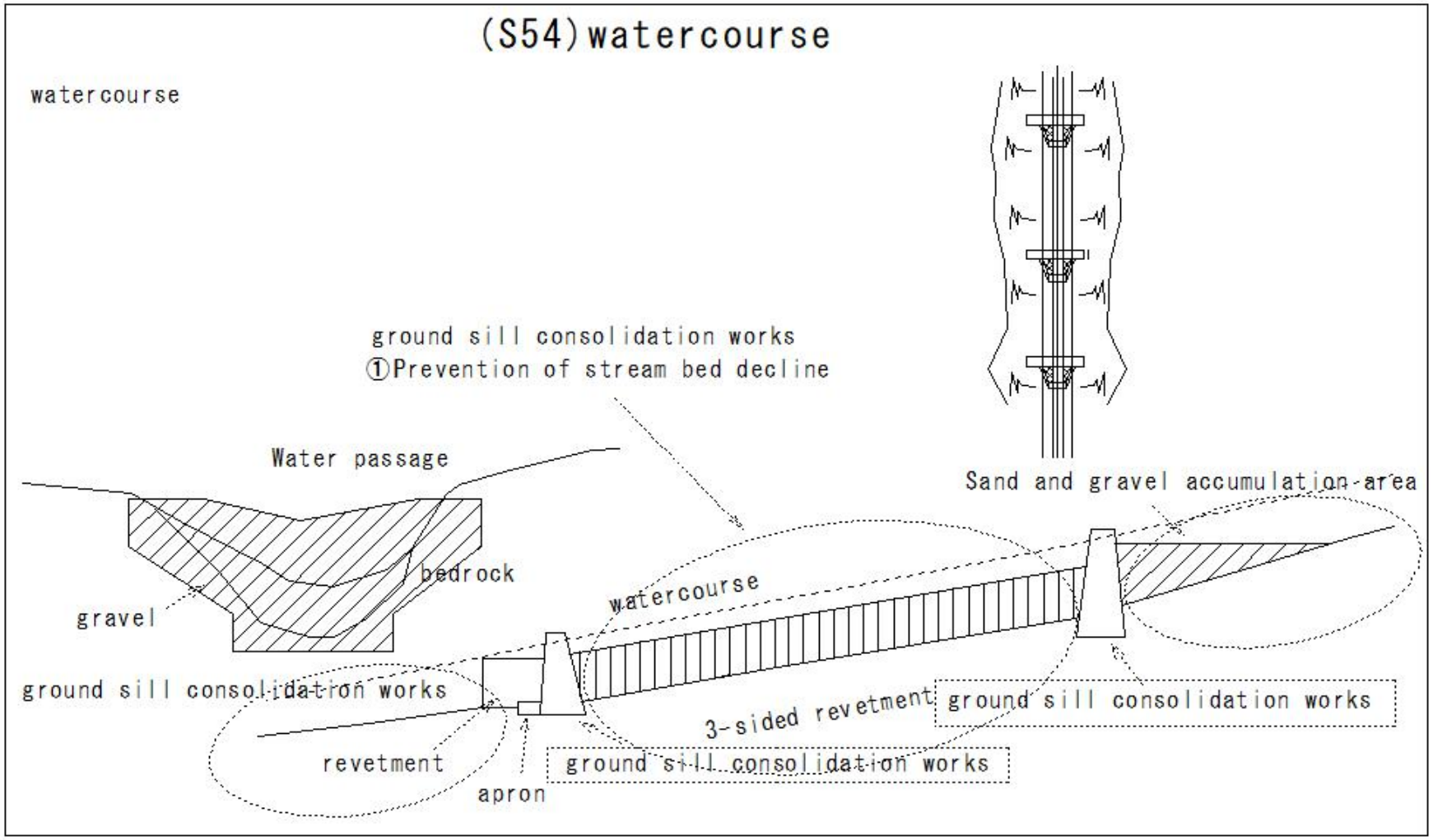
(S52)watercourse



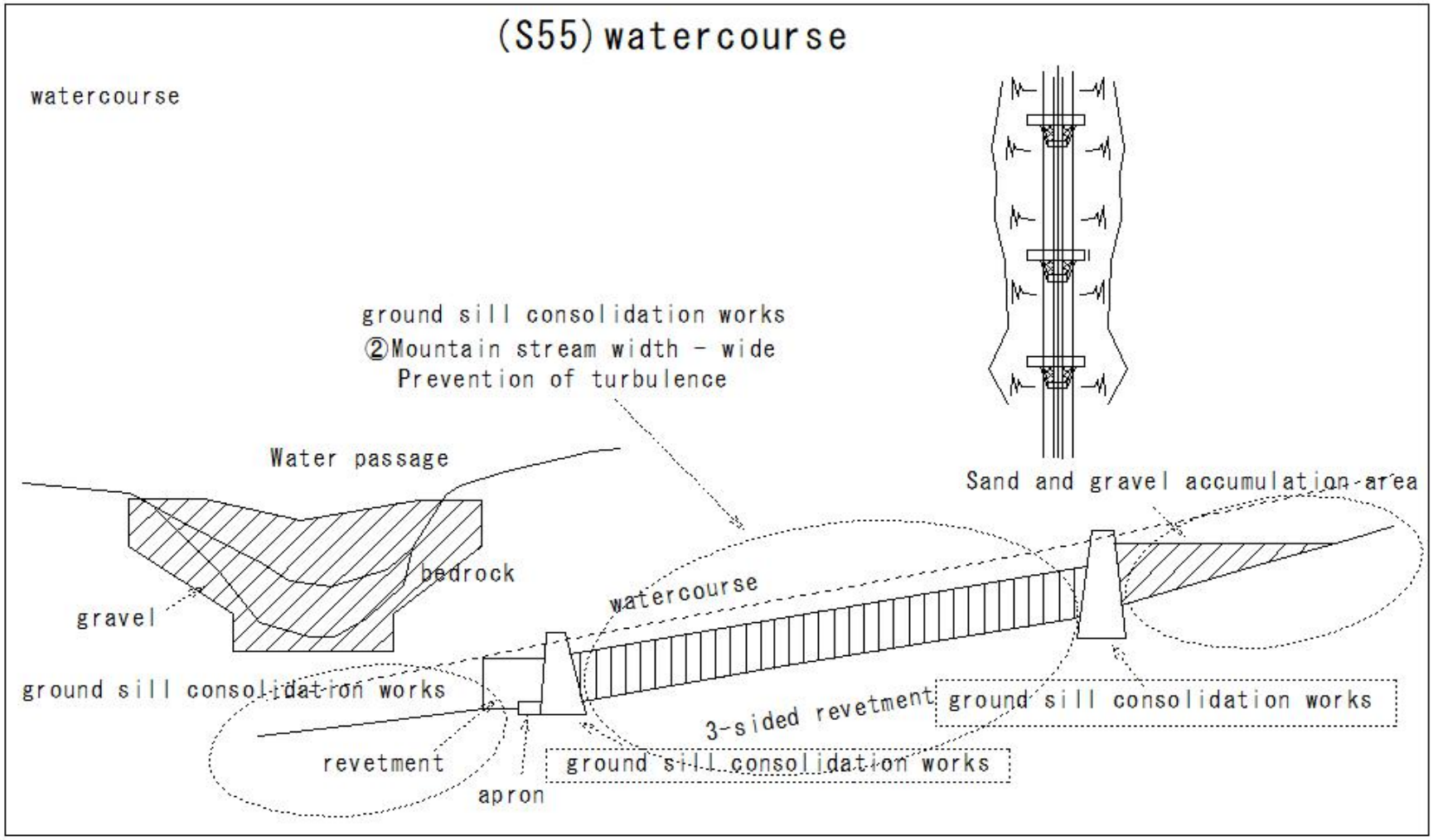
(S53)watercourse



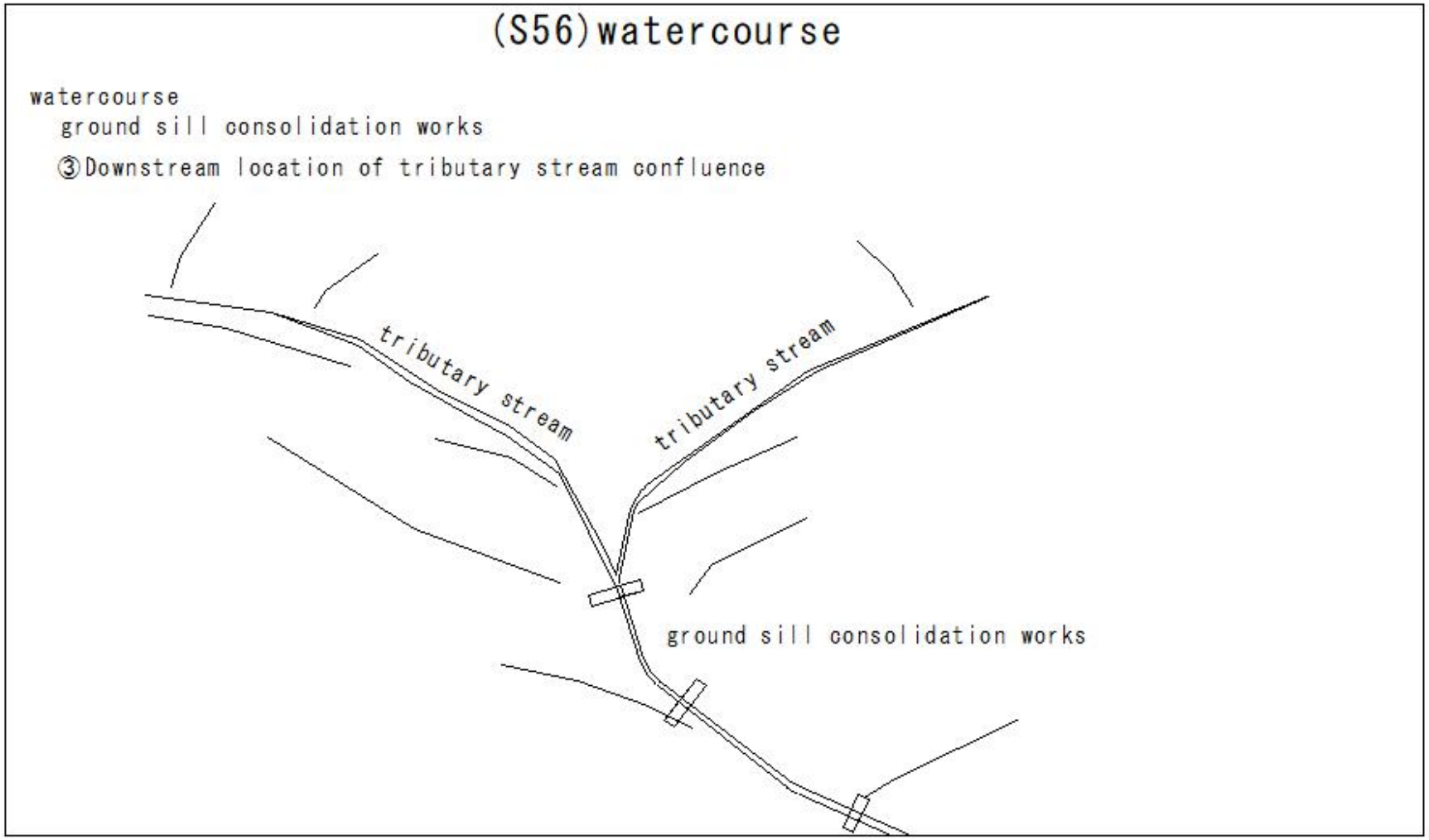
(S54)watercourse



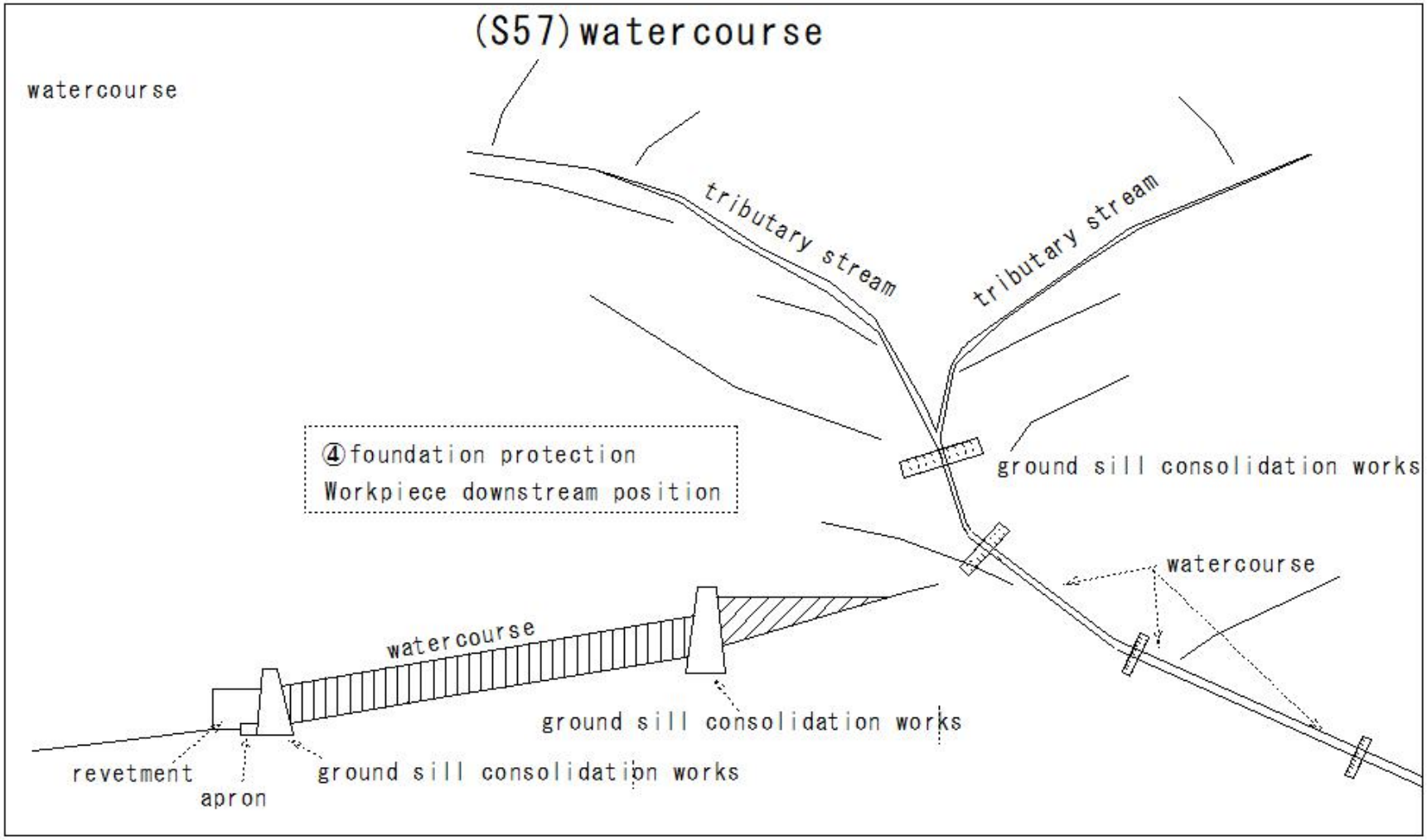
(S55)watercourse



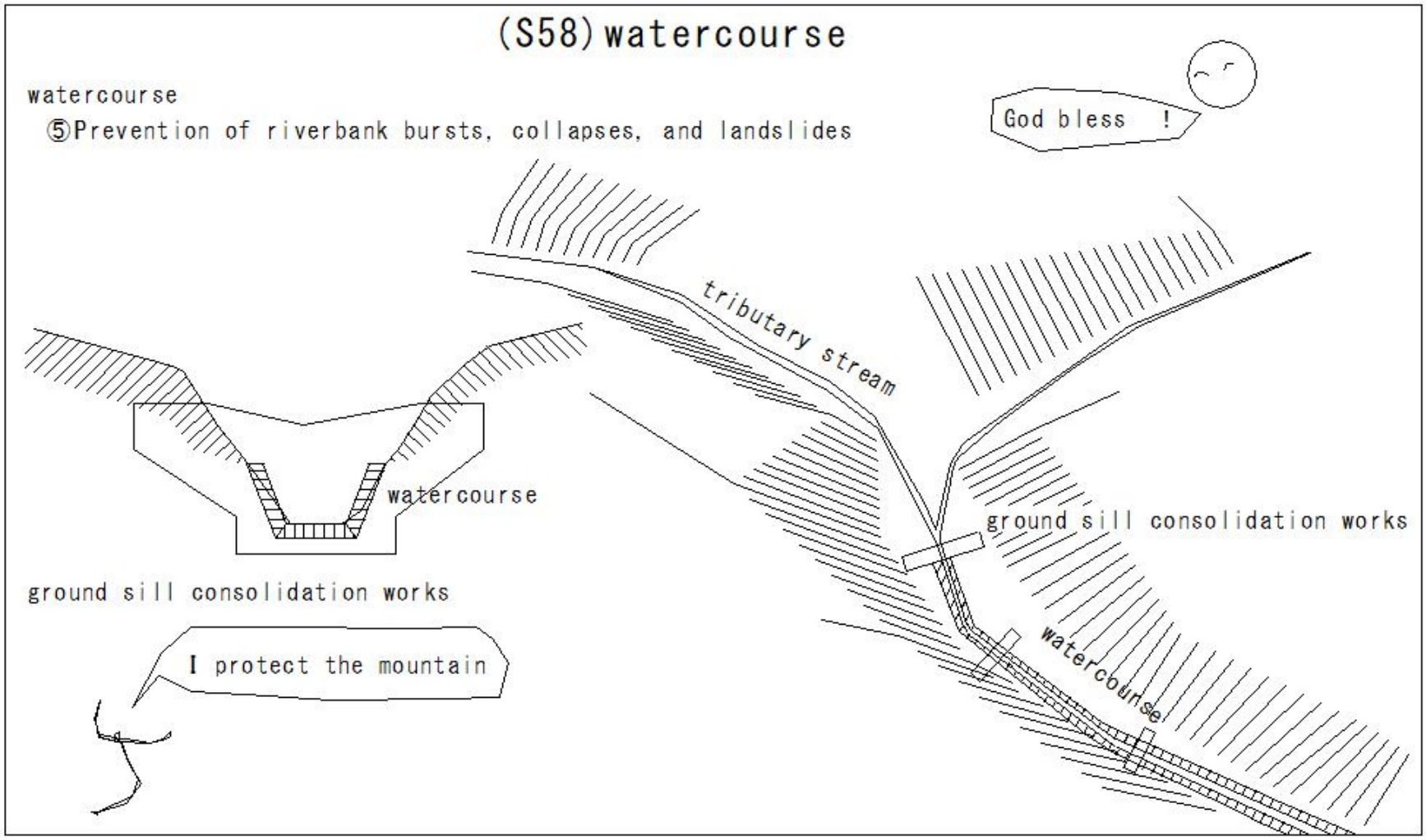
(S56)watercourse



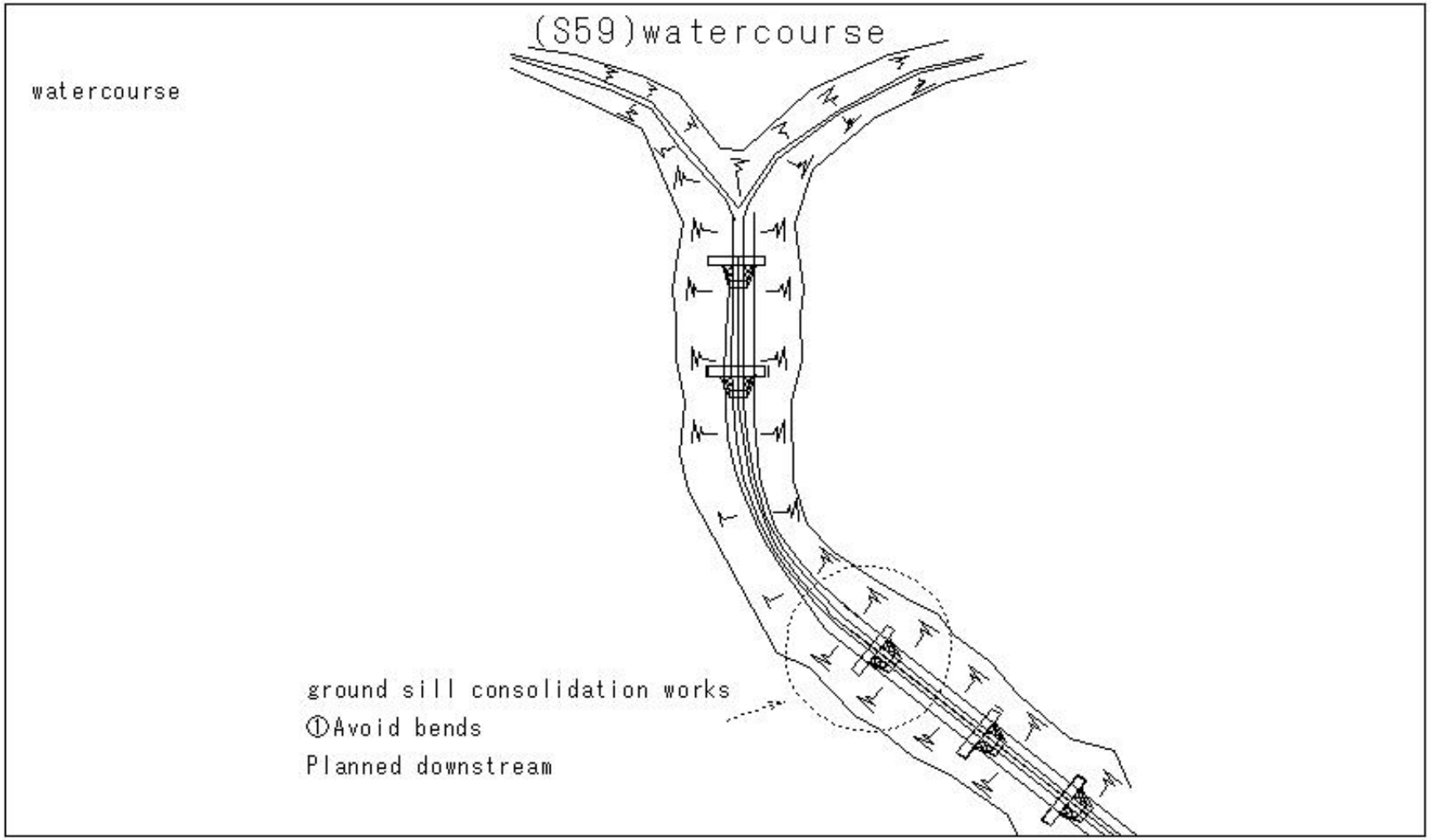
(S57)watercourse



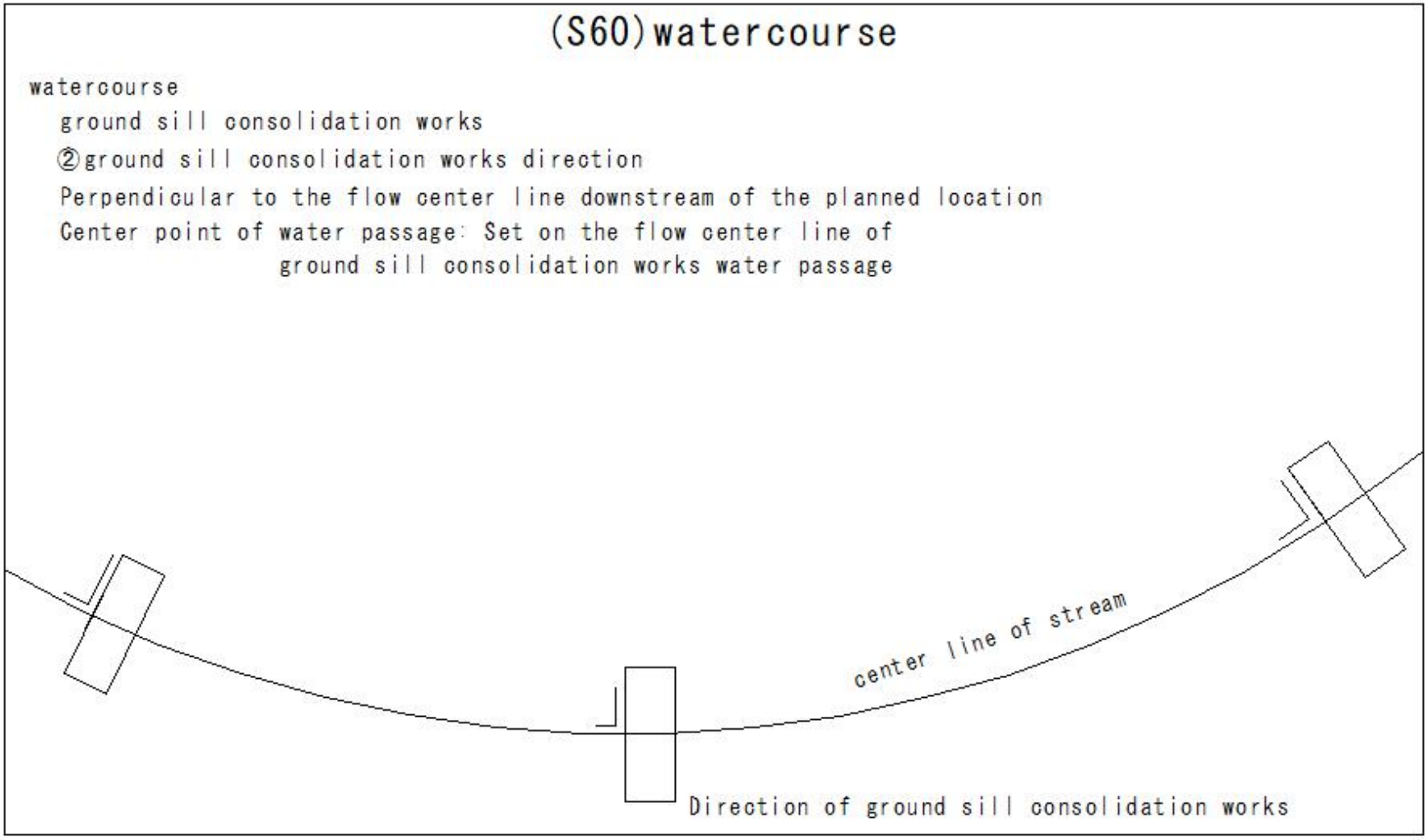
(S58)watercourse



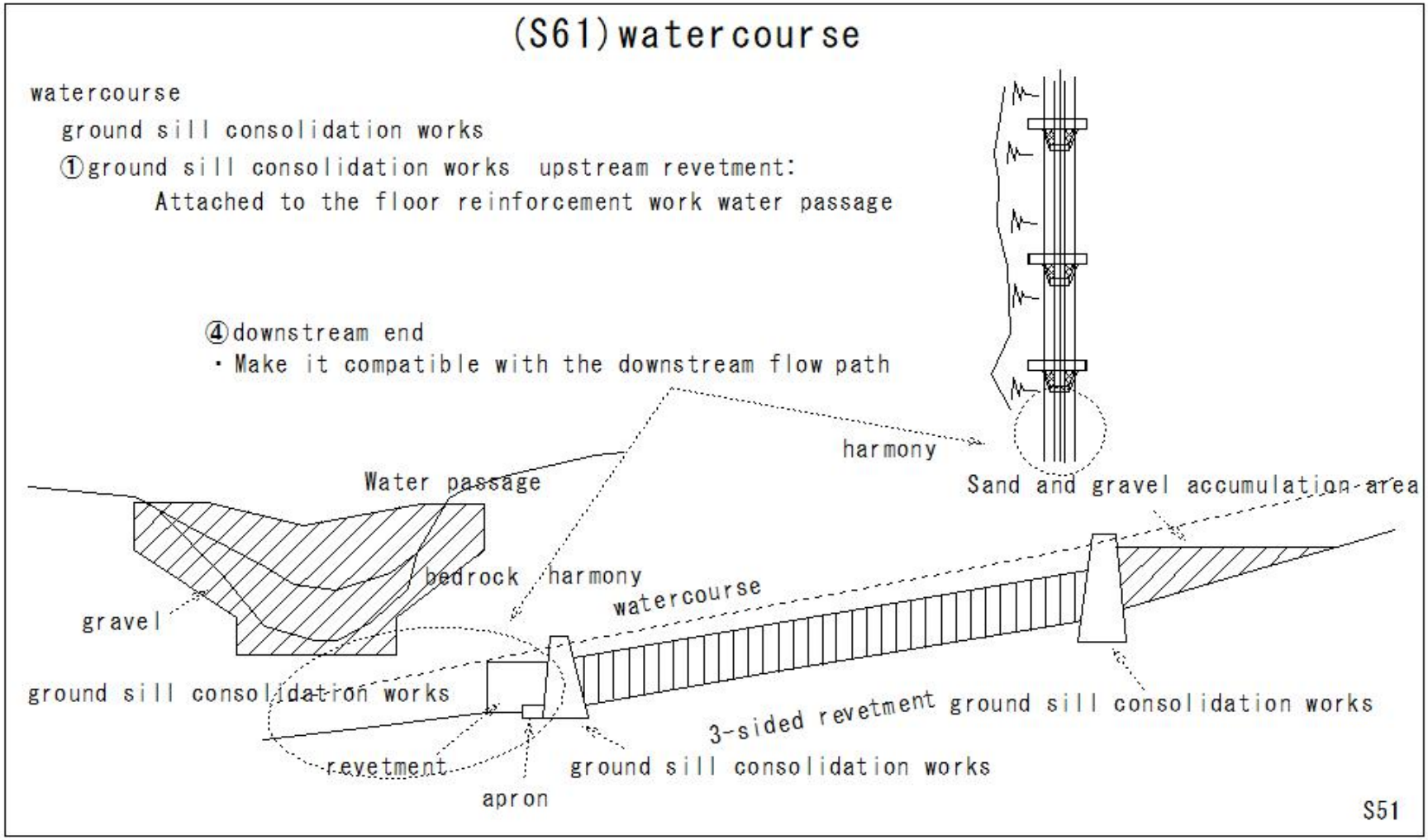
(S59)watercourse



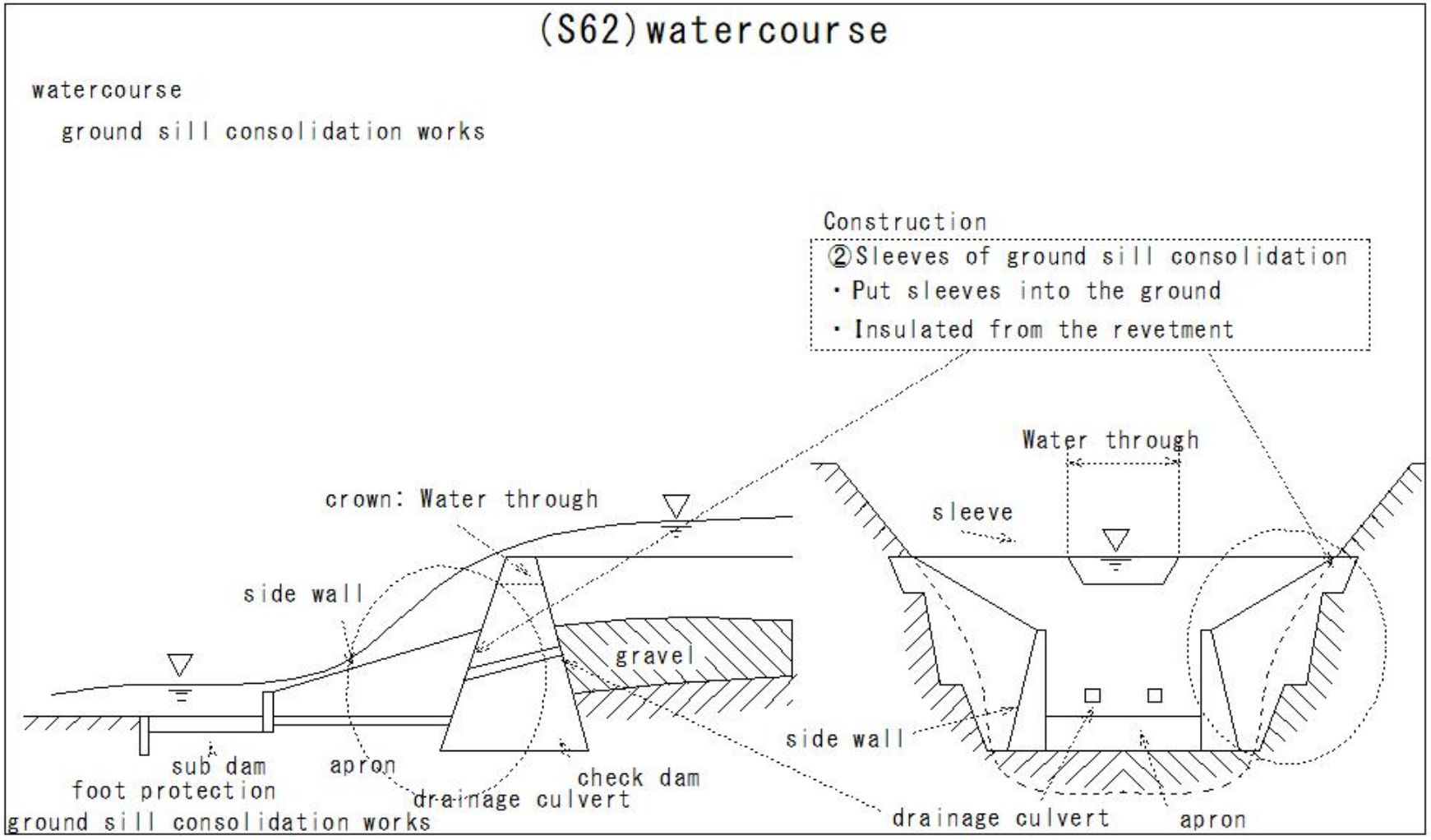
(S60)watercourse



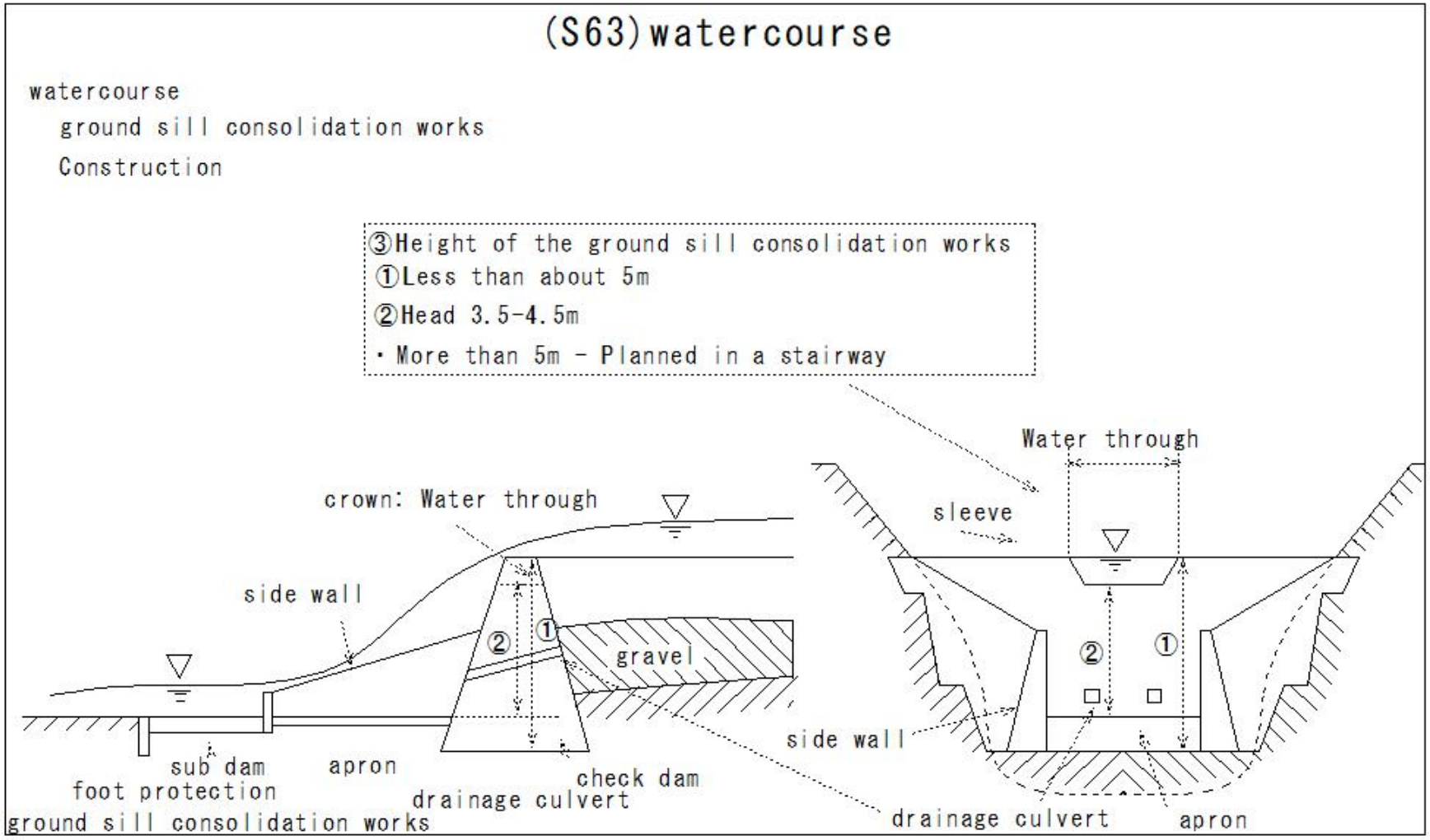
(S61)watercourse



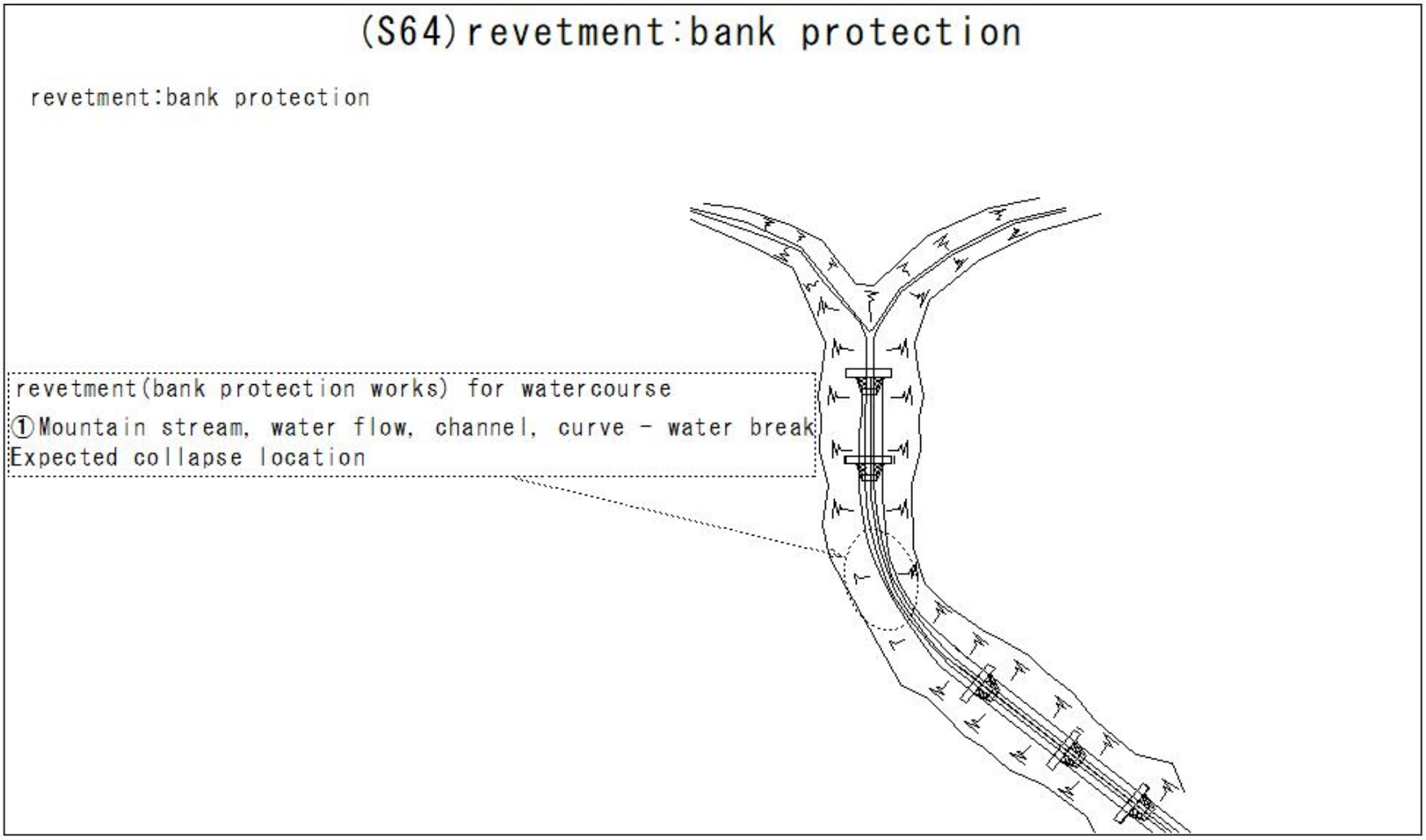
(S62)watercourse



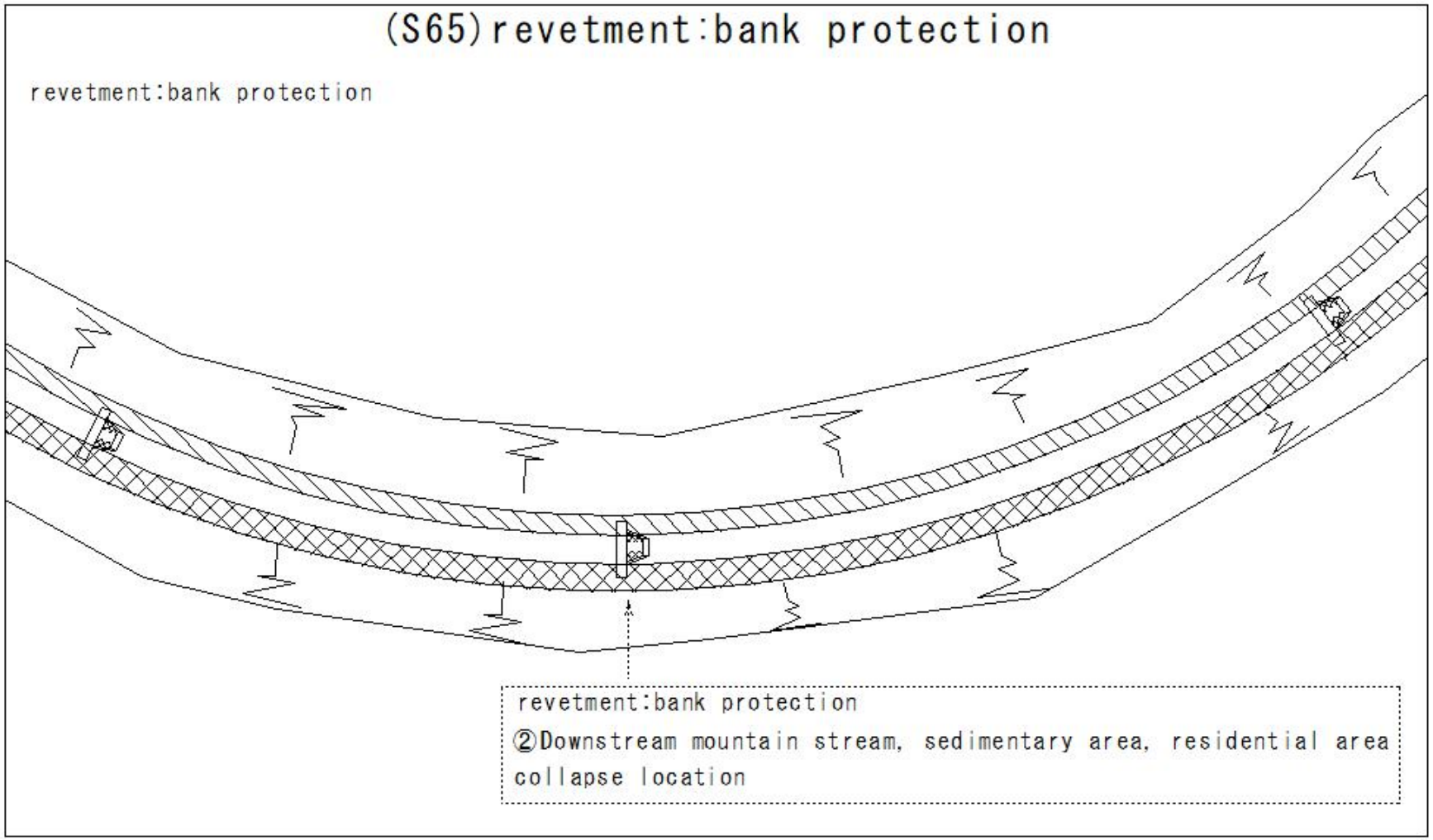
(S63)watercourse



(S64)revetment:bank protection



(S65)revetment:bank protection



(S66)revetment:bank protection

(S66)revetment:bank protection

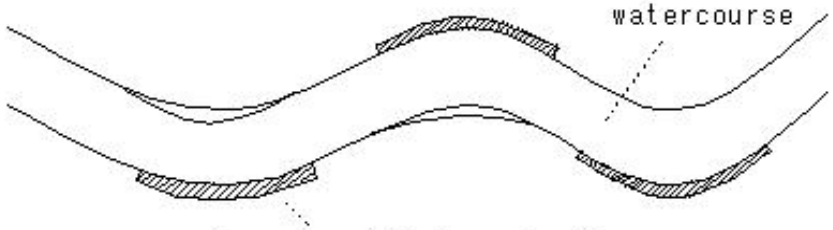
(revetment)bank protection

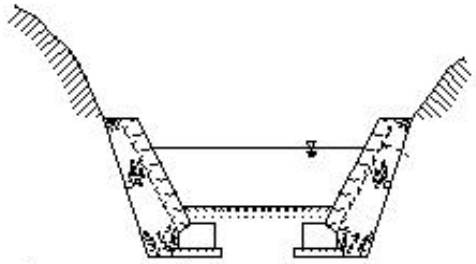
Bank protection works for watercourse

③River bank collapse-collapse prevention

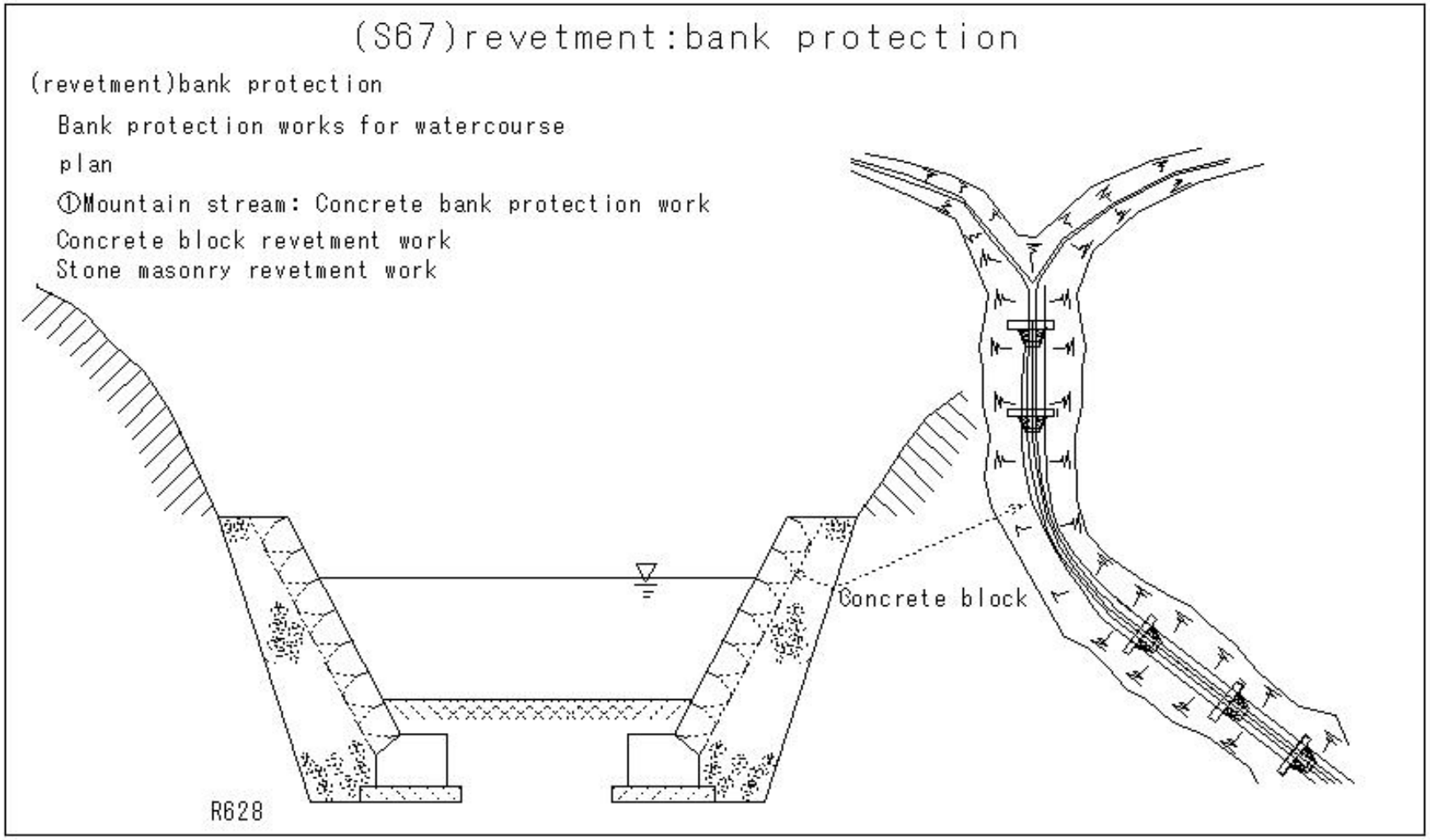
ground sill consolidation works/dam work

foot protection - revetment work

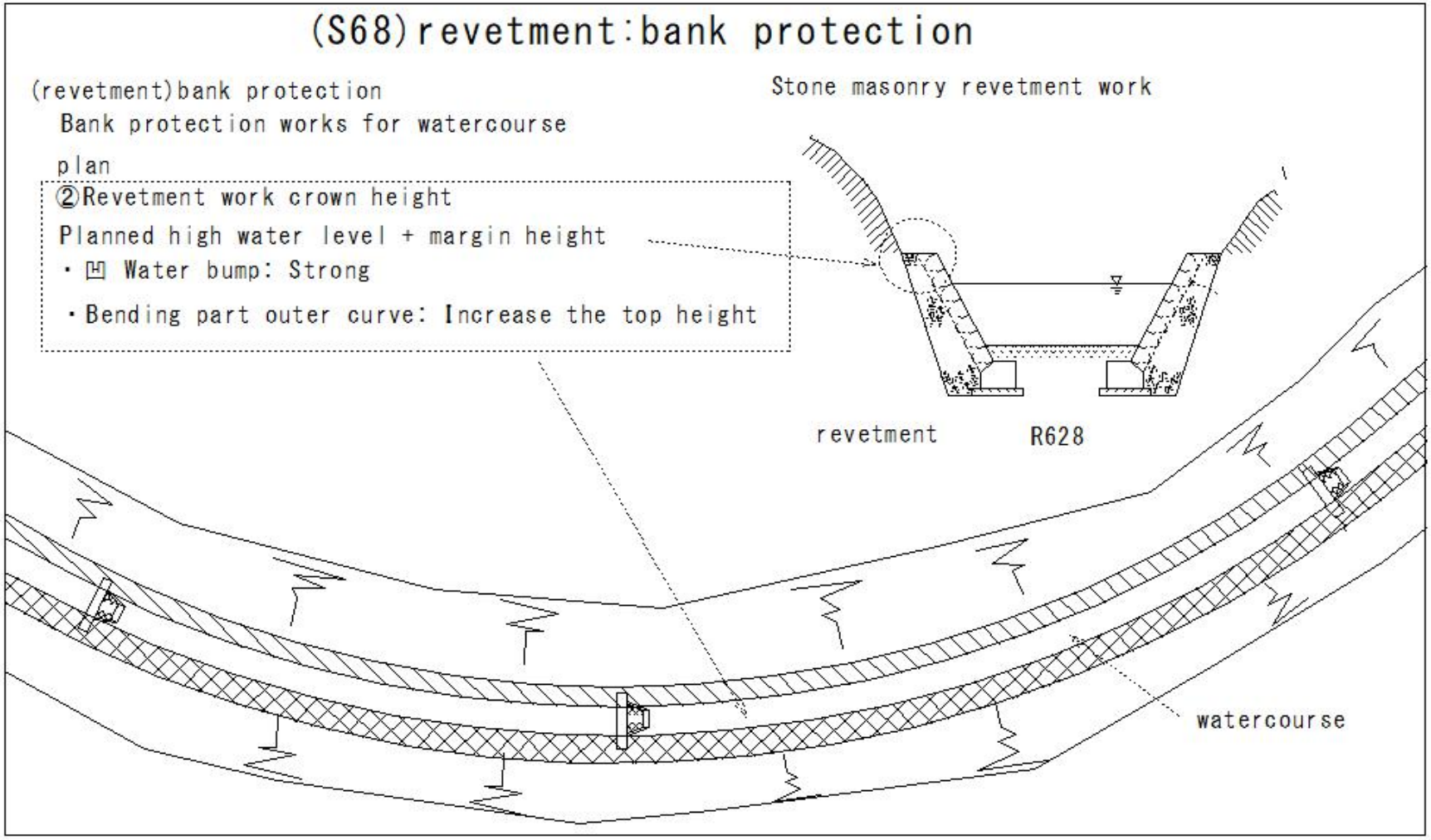




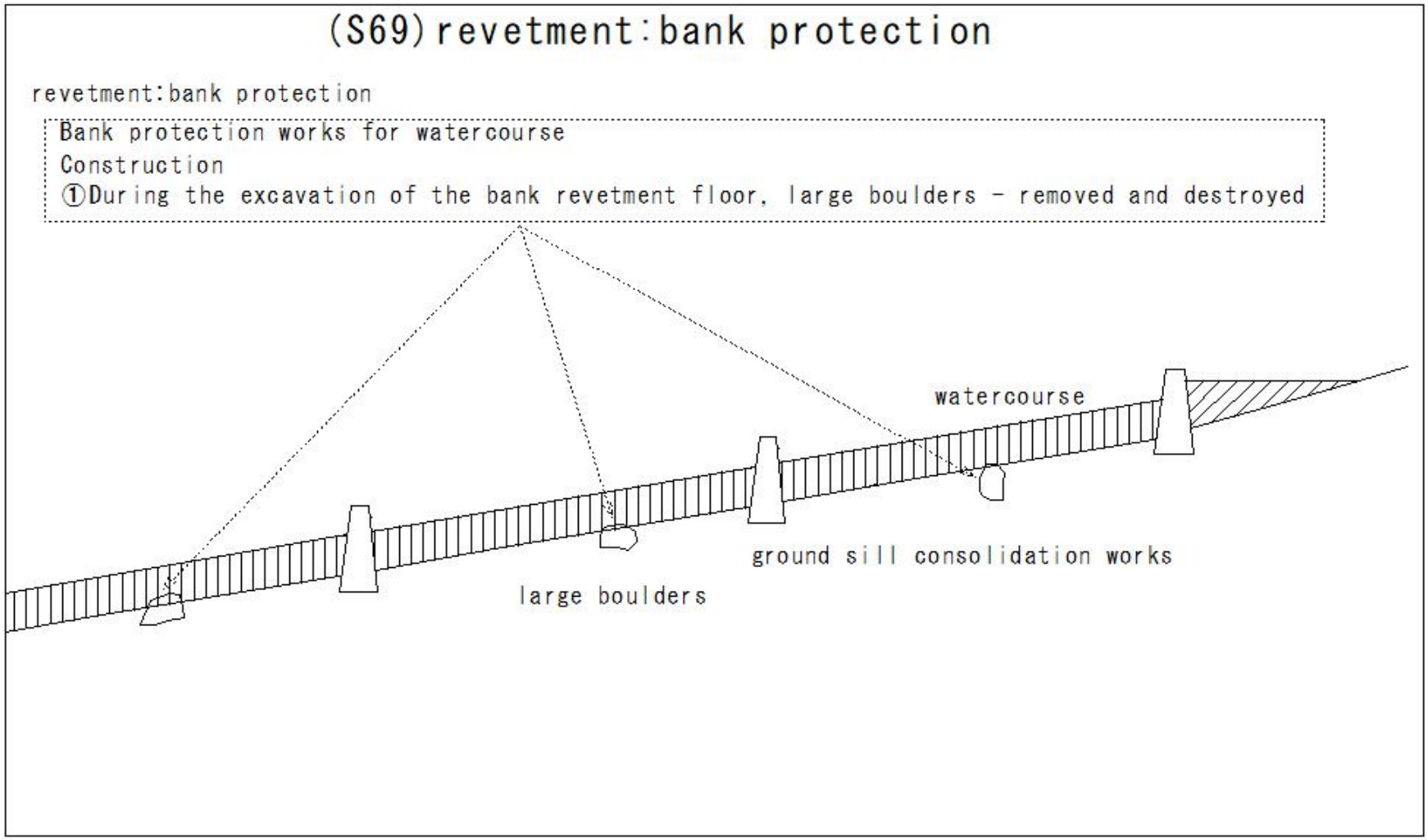
(S67)revetment:bank protection



(S68)revetment:bank protection



(S69)revetment:bank protection



(S70)revetment:bank protection

(S70)revetment:bank protection

(revetment)bank protection

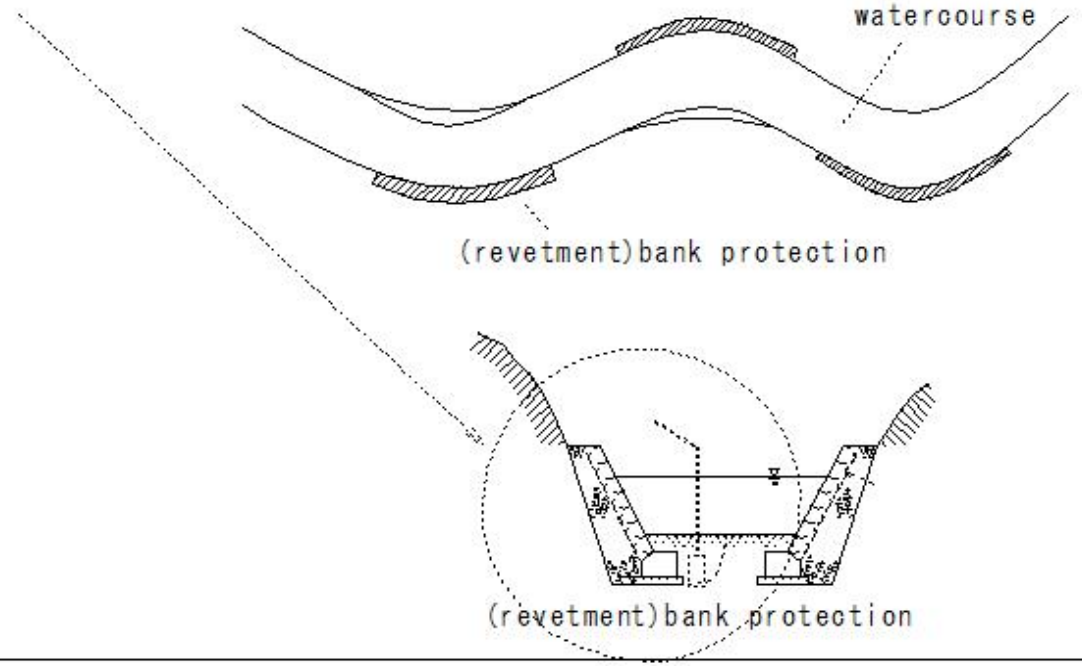
Bank protection works for watercourse

Construction

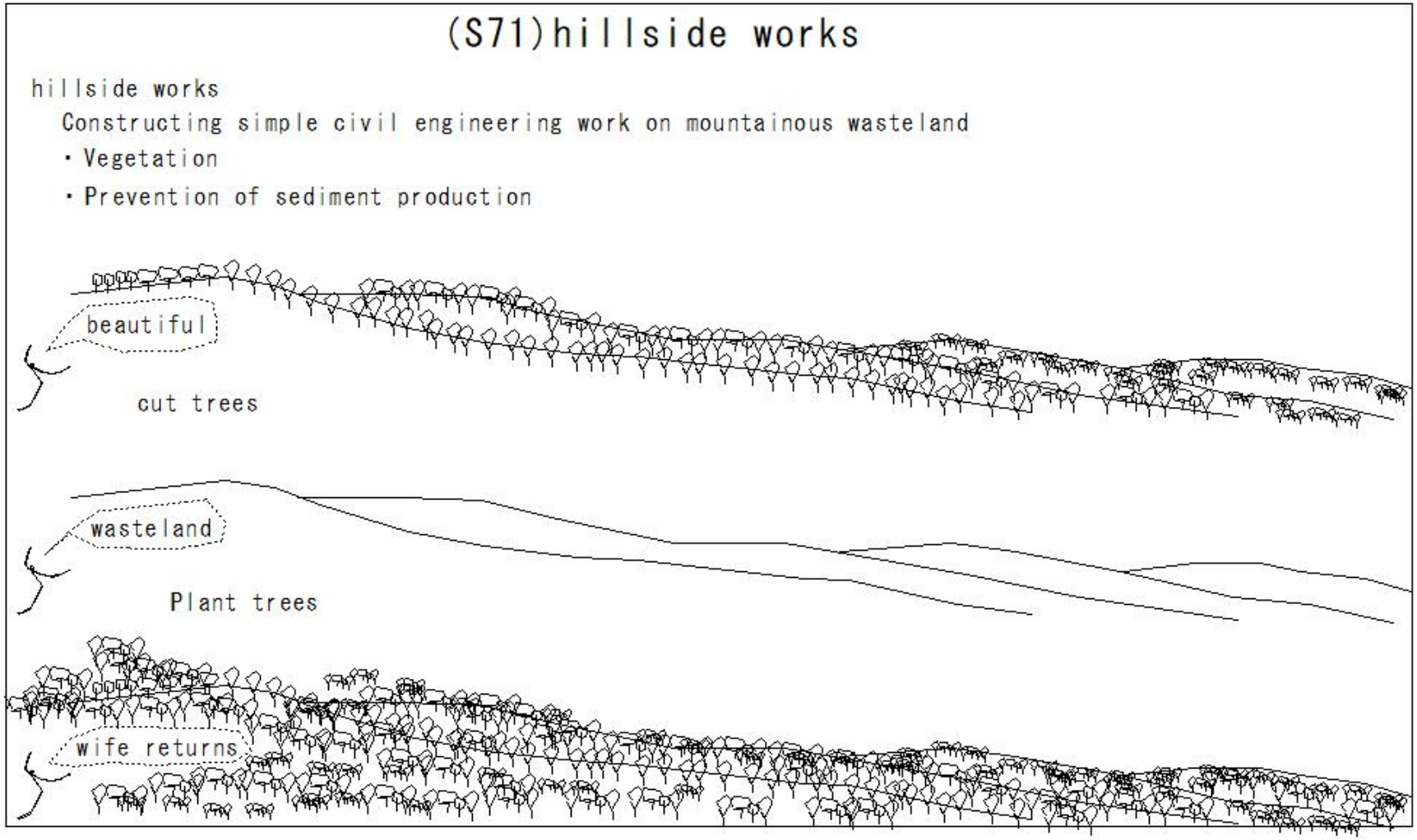
②case of spring water during the excavation of the revetment bed

・Direct spring water

・Increased amount of backfilling for revetment



(S71)hillside works



(S72)hillside works

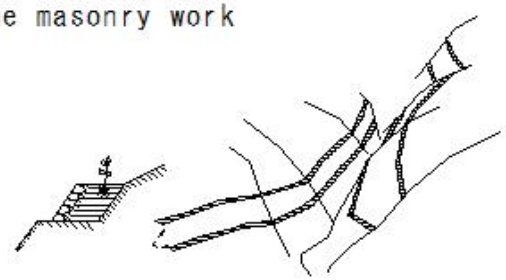
(S72)hillside works

hillside works

①Valley work

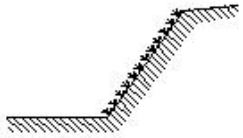
- Erosion valley within the collapsed area
- Directly downstream of the mountainside security
- stone masonry work
- sodding work
- fence work
- wire cylinder masonry work(gabion)

・stone masonry work



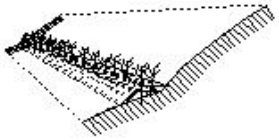
S183

・sodding work



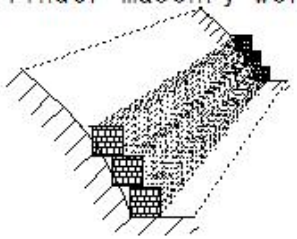
S157

・fence work

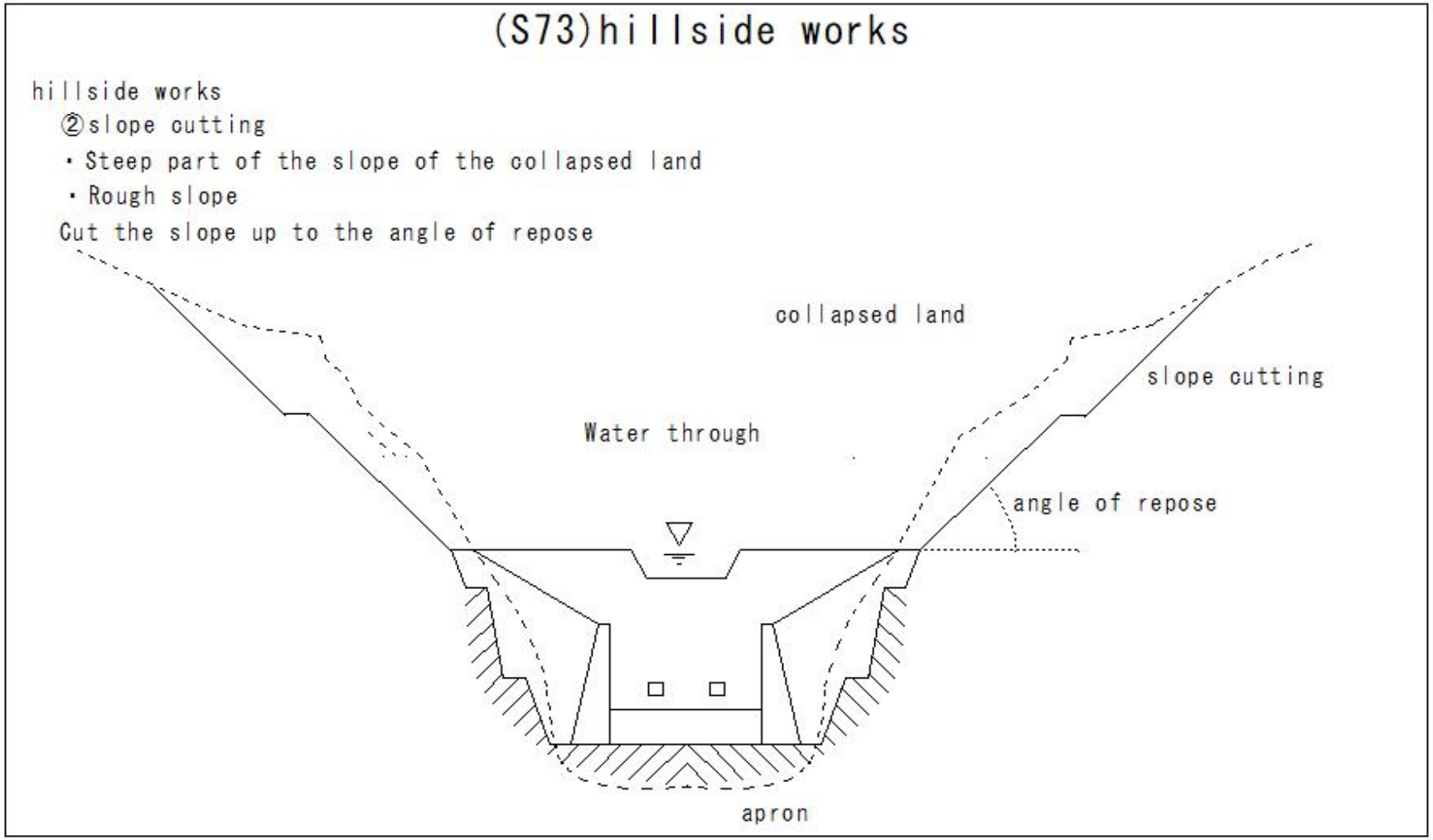


S77

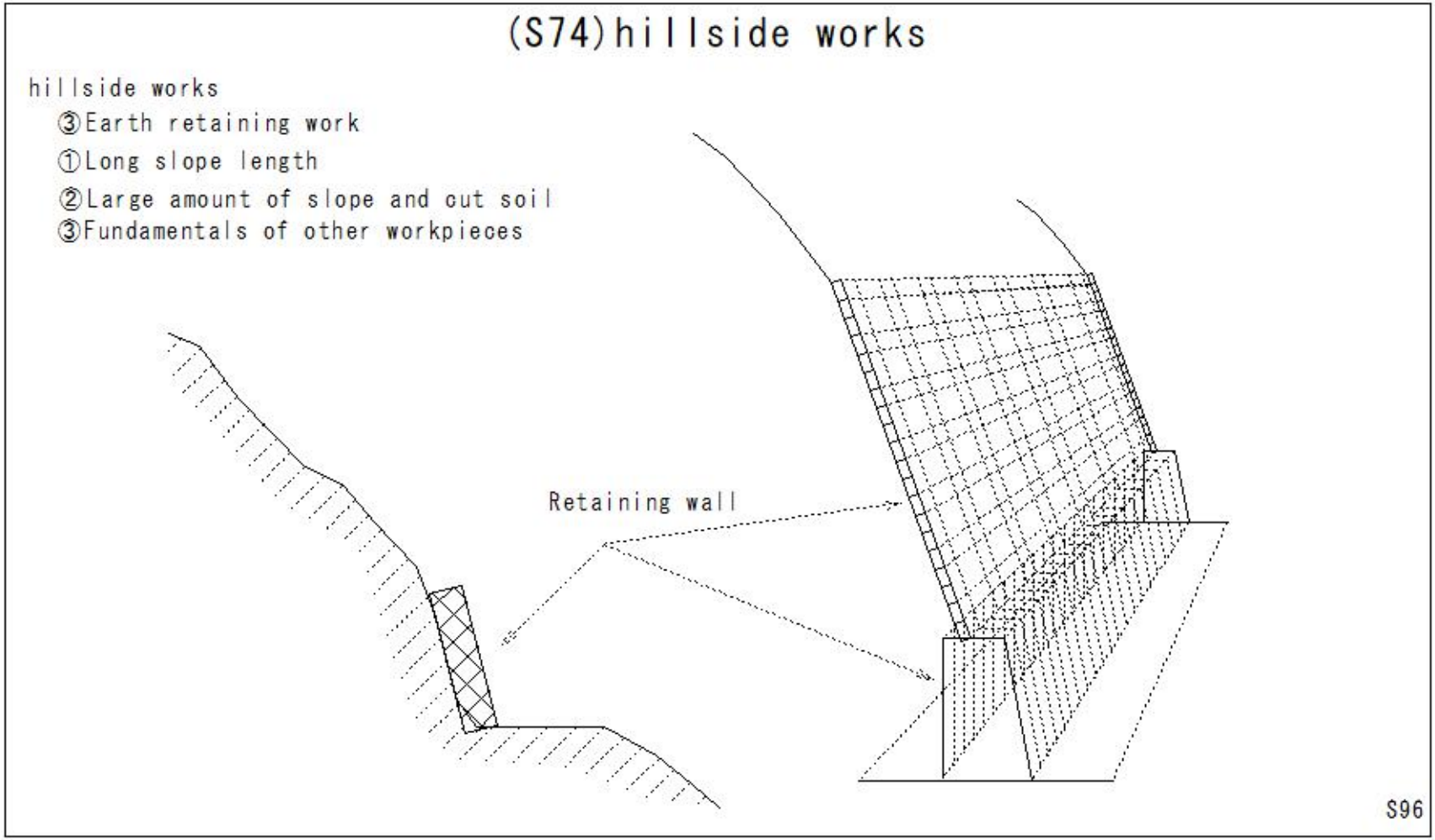
・wire cylinder masonry work(gabion)



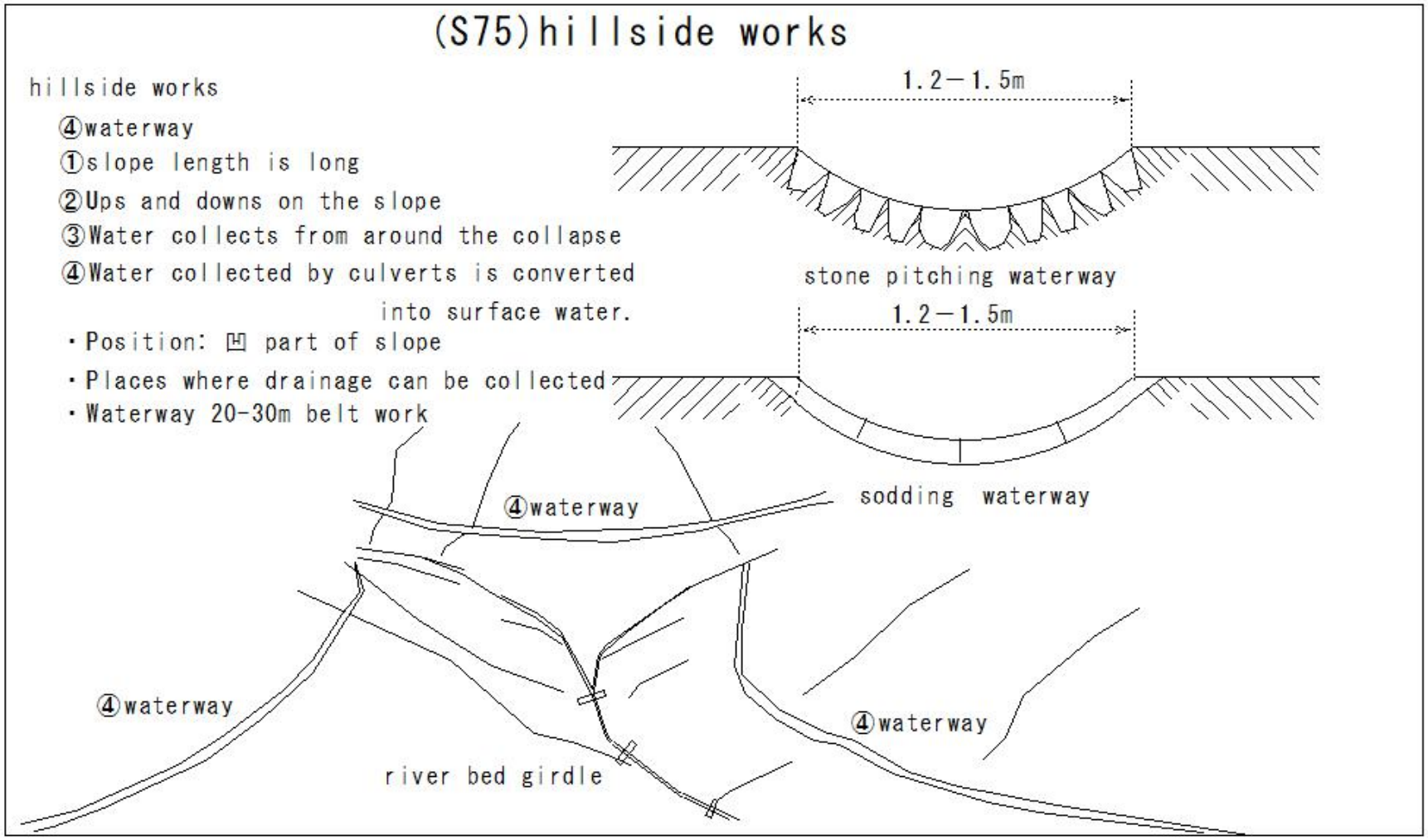
(S73)hillside works



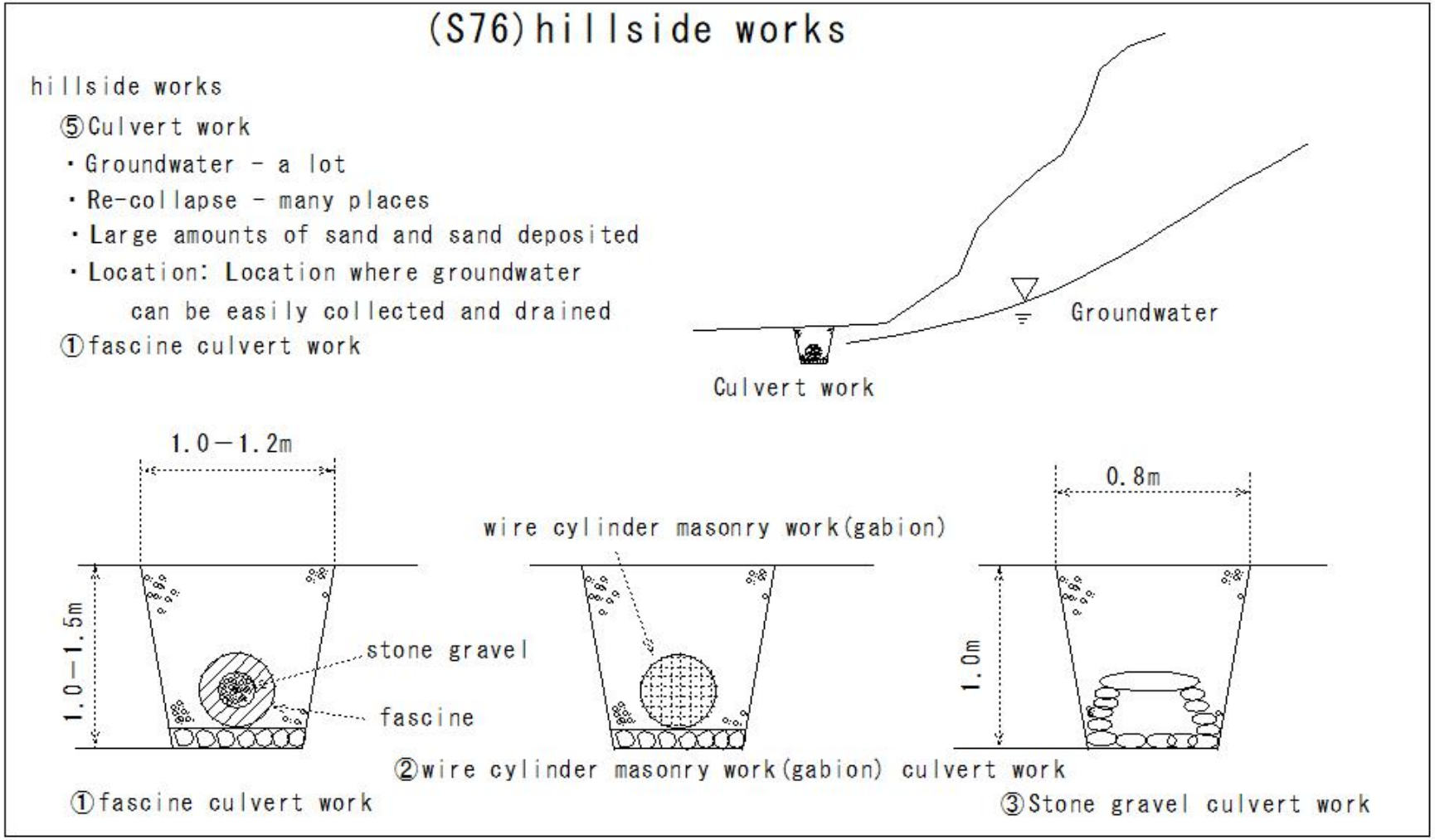
(S74)hillside works



(S75)hillside works



(S76)hillside works



(S77)hillside works

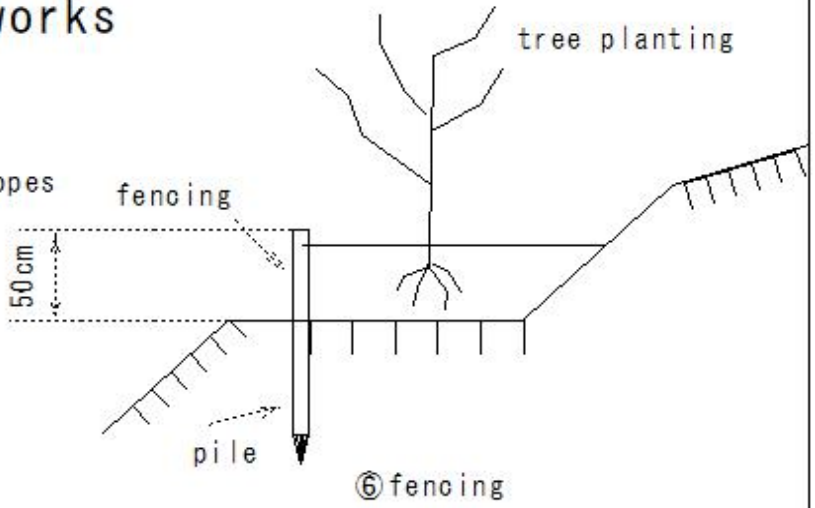
(S77)hillside works

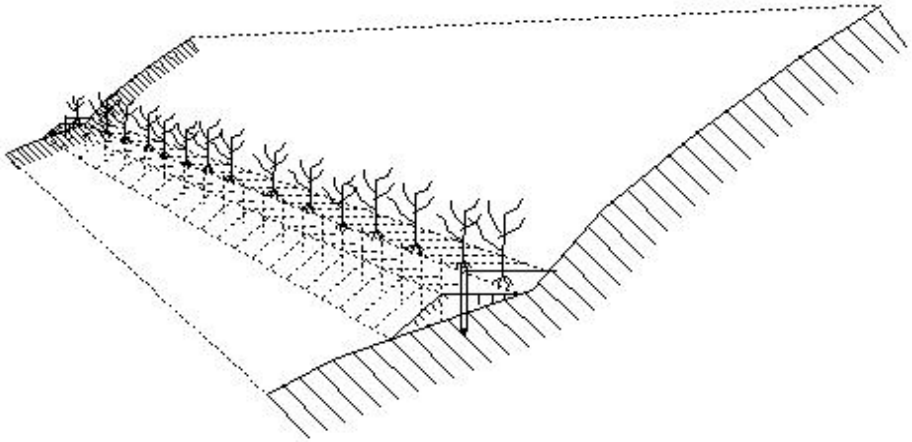
hillside works

⑥fencing

- Points where topsoil flows out on mountainside slopes
- Positions where vegetation can be introduced

Height of pilework: approximately 50cm





(S78)hillside works

(S78)hillside works

hillside works

⑧tree planting works

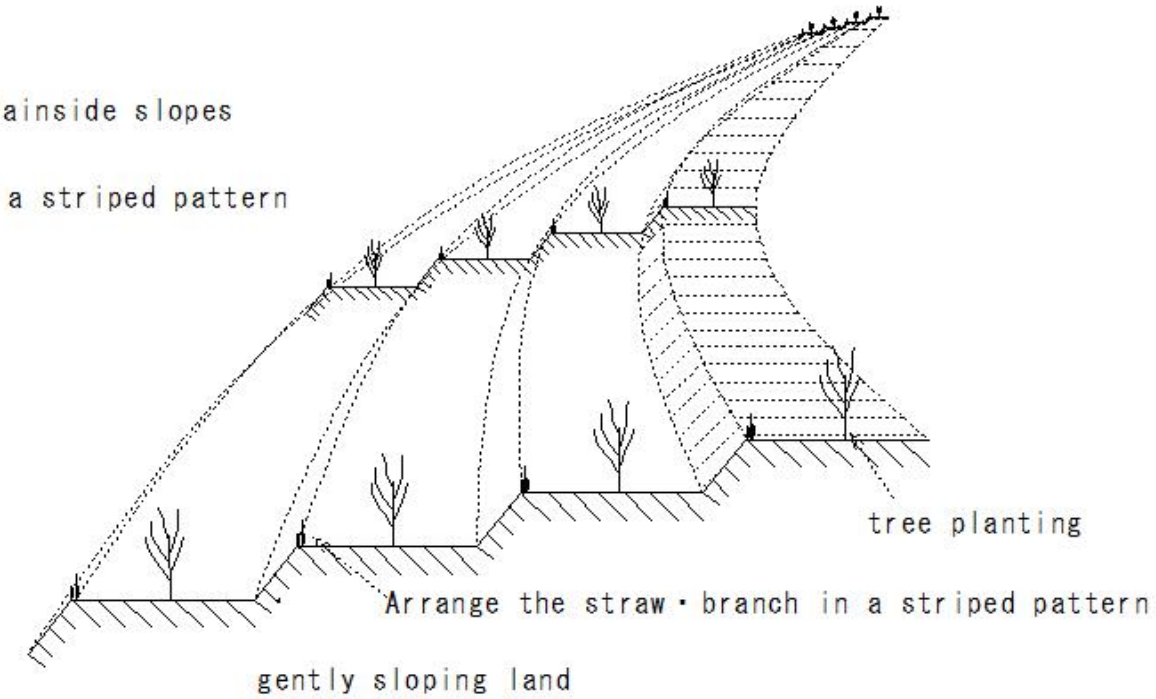
・Top soil - deep

・Rainwater distribution

・Preventing erosion of mountainside slopes

・Vegetation-early planting

Arrange the straw・branch in a striped pattern



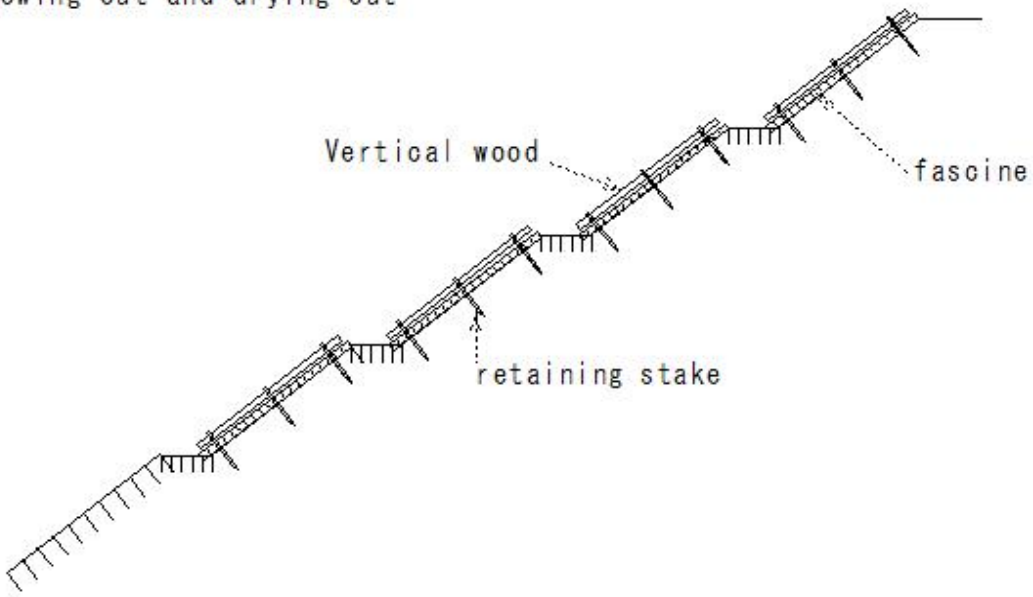
(S79)hillside works

(S79)hillside works

hillside works

⑨fascine work

- Erosion caused by rain, frozen soil, frost pillars, wind, etc.
- Vegetation on the slope
- Sowing seeds
- Prevent seeds from flowing out and drying out



(S80)hillside works

(S80)hillside works

hillside works

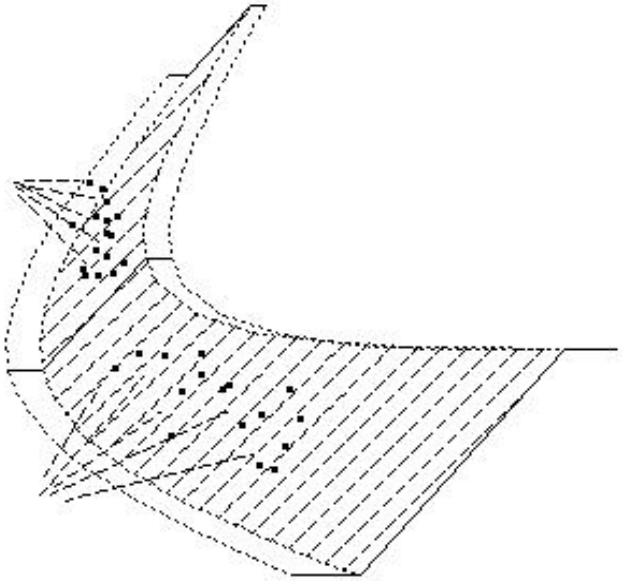
◎Seed sowing

・Slope - short

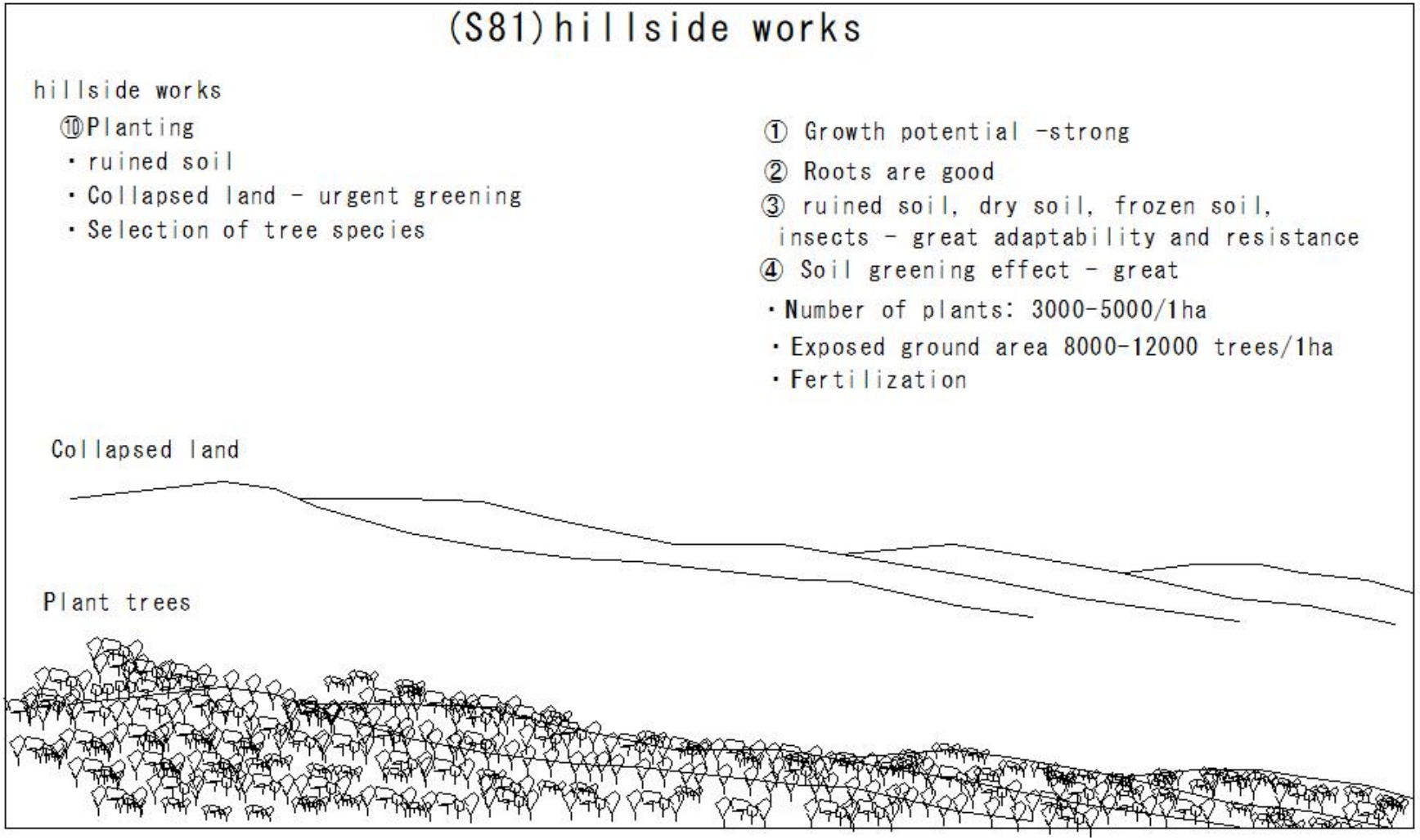
・Good land conditions

・Early greening

◎Seed sowing



(S81)hillside works



(S82)Landslide prevention work

(S82)Landslide prevention work

Landslide prevention work
construction method

①landslide control works

②Surface water drainage works

③waterway Penetration prevention work

④Underground drainage works

⑤Shallow layer ⑥open channel・culvert bowling groundwater cutoff

⑦Deep layer ⑧Bowling , water collection well , tunnel

⑨Earth removal work

⑩Loading embankment method

⑪River structures ⑫Dam, ground sill consolidation works, bank protection

⑬landslide restraining works

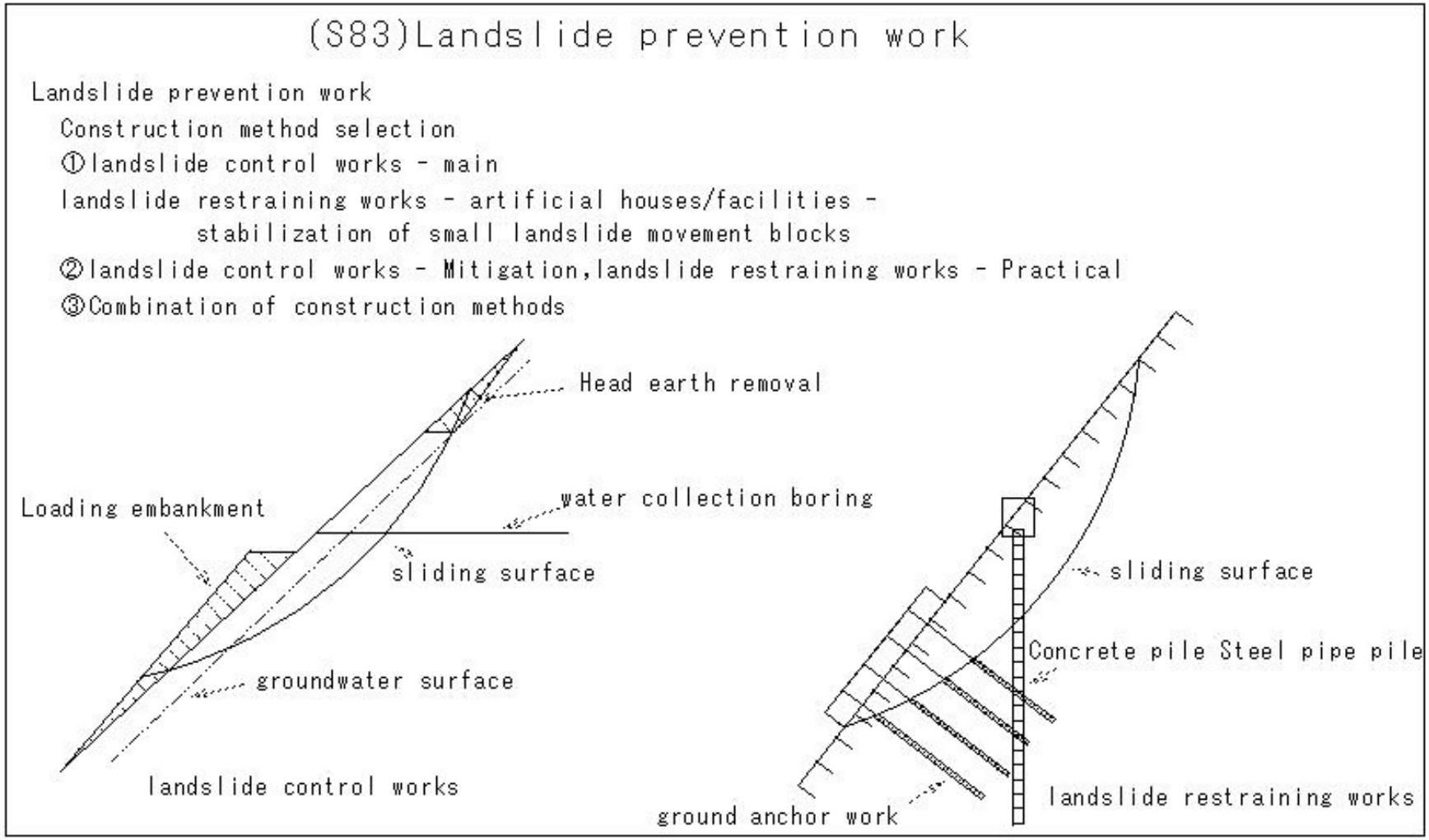
⑭Pile driver

⑮Shaft work

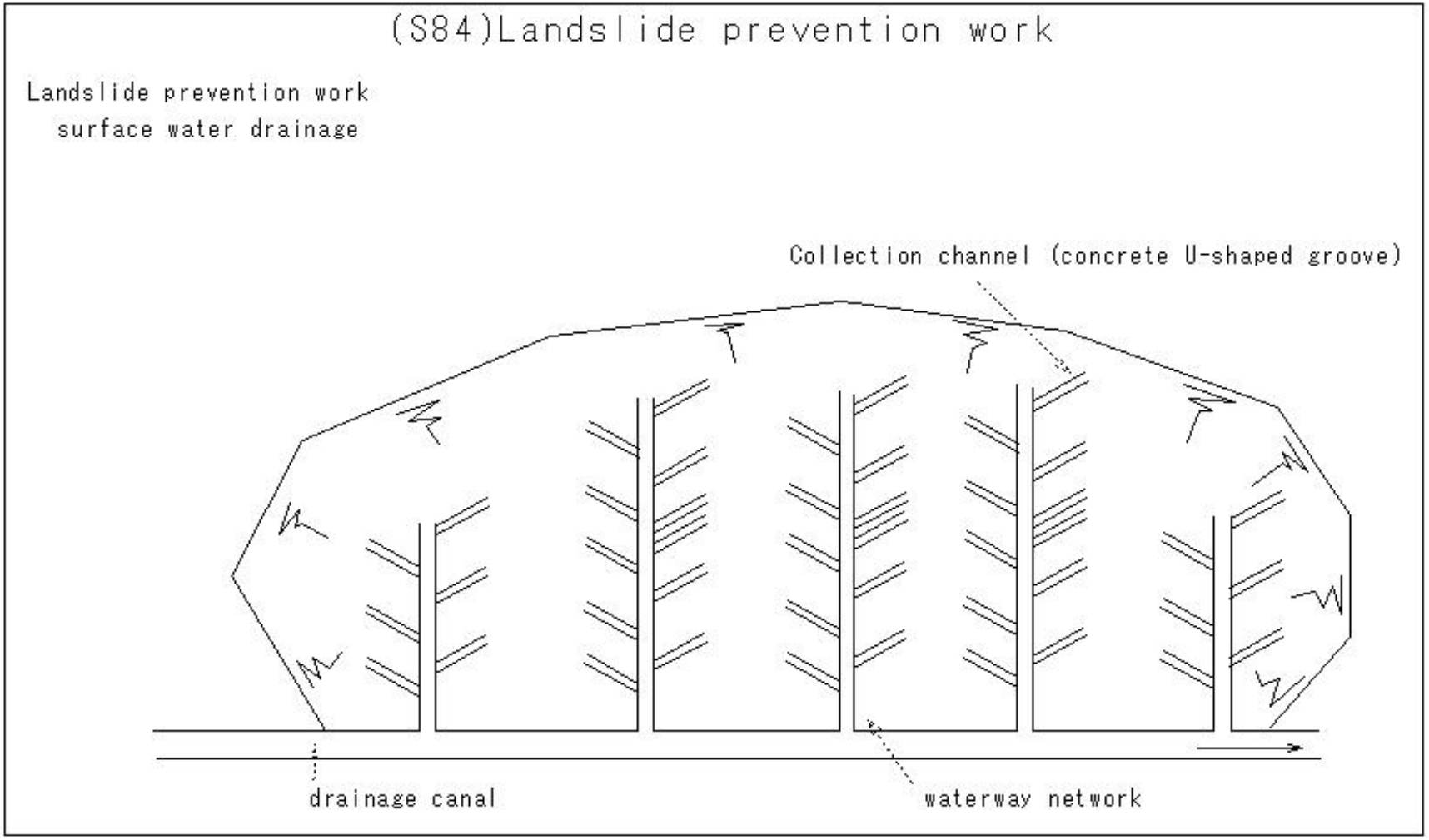
⑯Anchor work

⑰Retaining wall work

(S83)Landslide prevention work



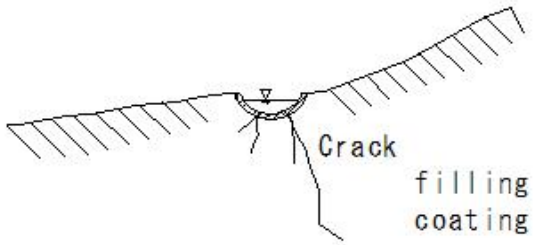
(S84)Landslide prevention work



(S85)Landslide prevention work

(S85)Landslide prevention work

Landslide prevention work
surface water drainage
Penetration prevention work
Crack occurrence location
:Clay cement filling
vinyl coating
Leakage prevention work for swamp waterways
Improvements such as covering, excavating swamps,
replacing waterways, etc.



(S86)Landslide prevention work

(S86)Landslide prevention work

Landslide prevention work

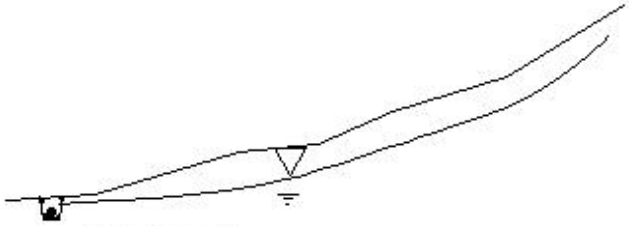
Groundwater drainage works

・Inside landslide area

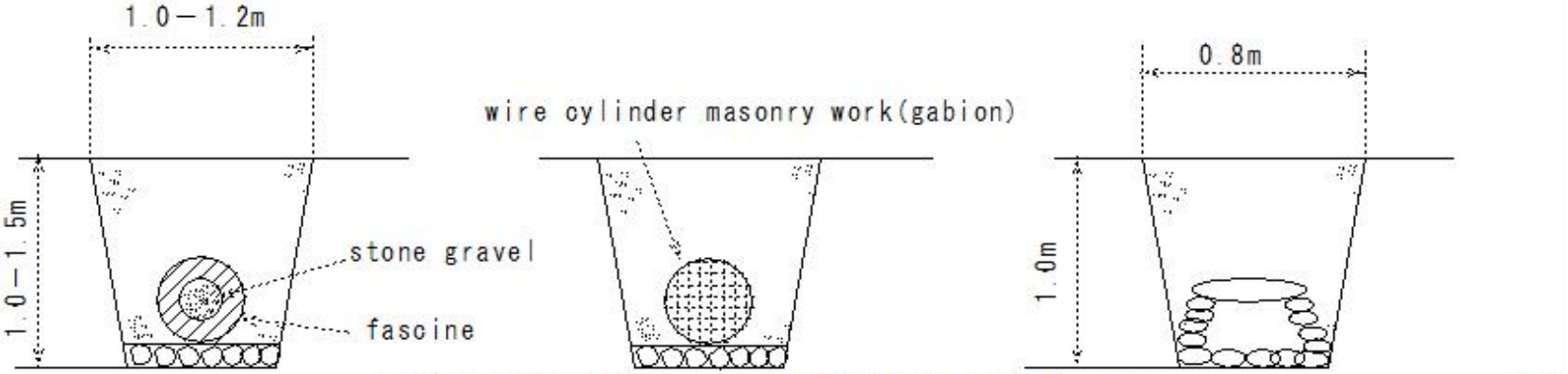
Groundwater drainage works

①Culvert

3m groundwater removal from the ground surface



①Culvert



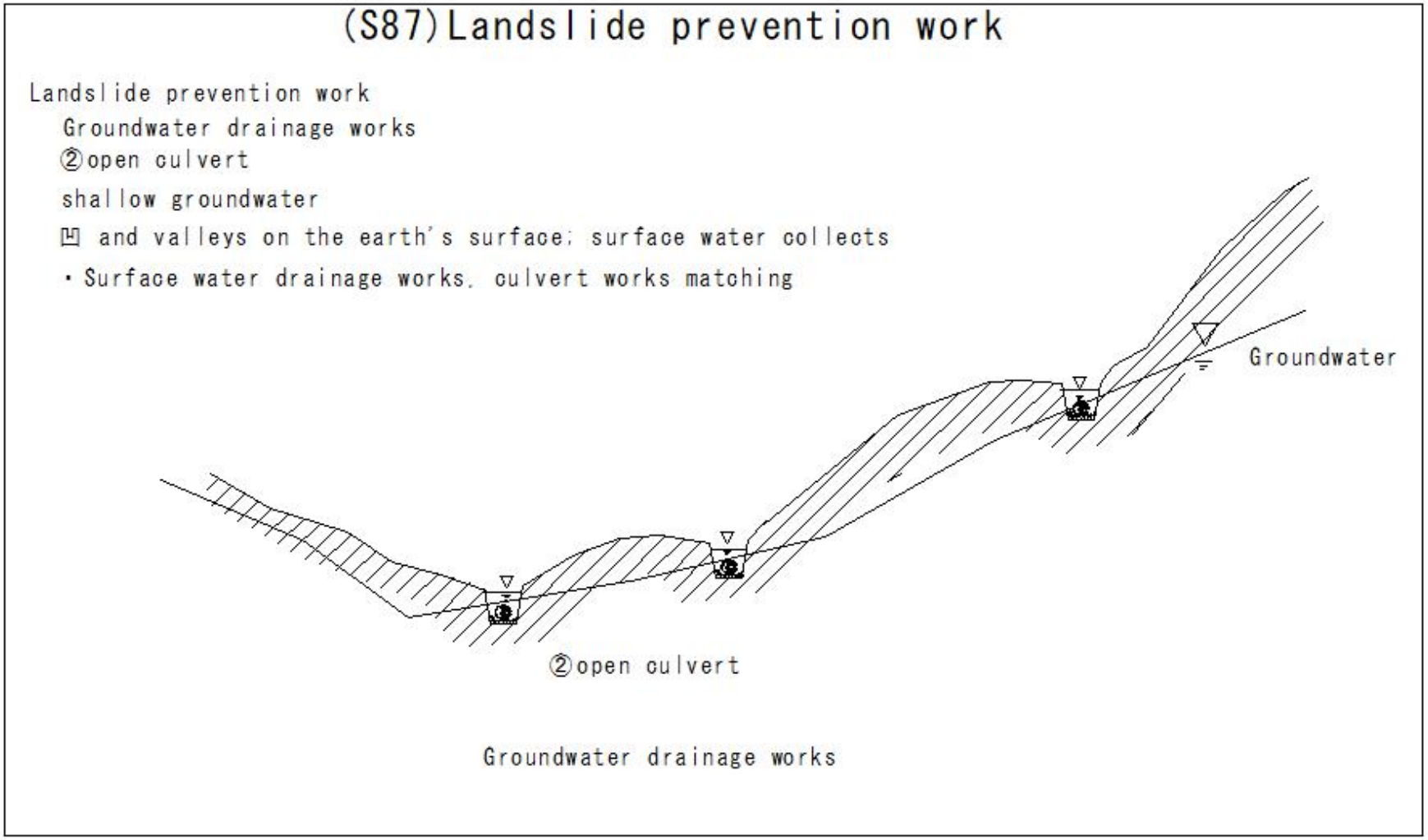
①fascine culvert work

②wire cylinder masonry work(gabion) culvert work

③Stone gravel culvert work

S76

(S87)Landslide prevention work



(S88)Landslide prevention work

(S88)Landslide prevention work

Landslide prevention work

Groundwater drainage works

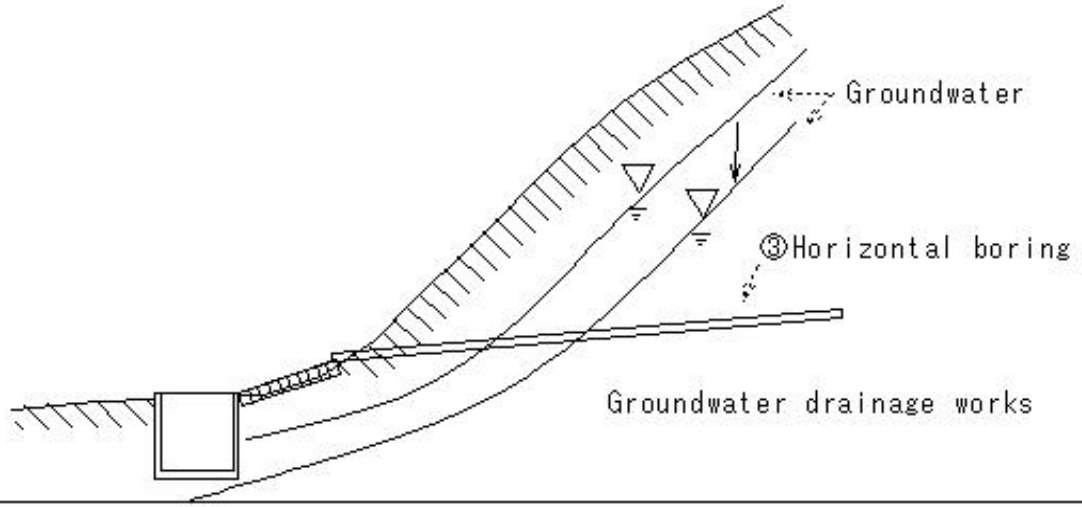
③Horizontal boring

Extension 20-50m

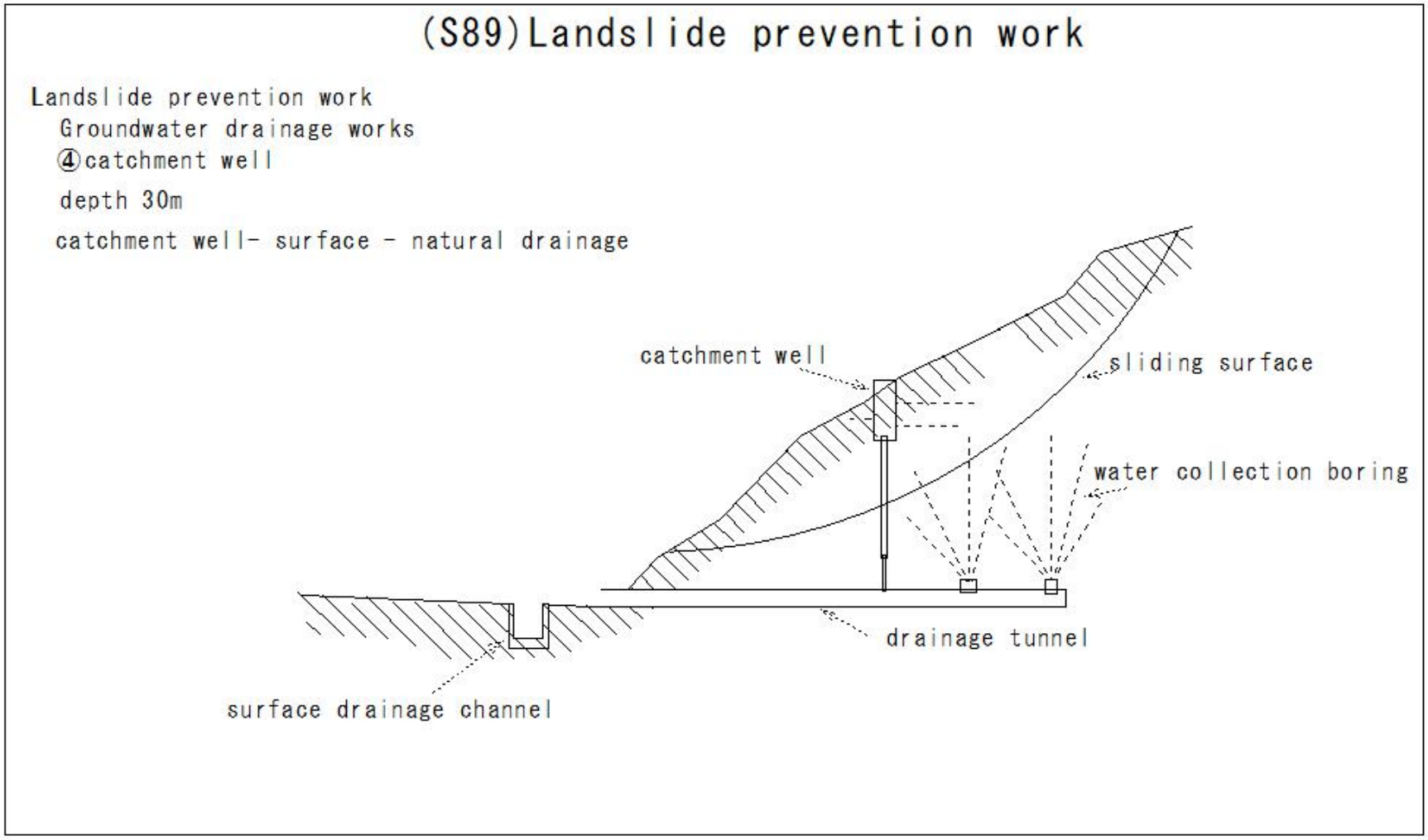
Horizontal boring

Boring machine - digging a horizontal hole

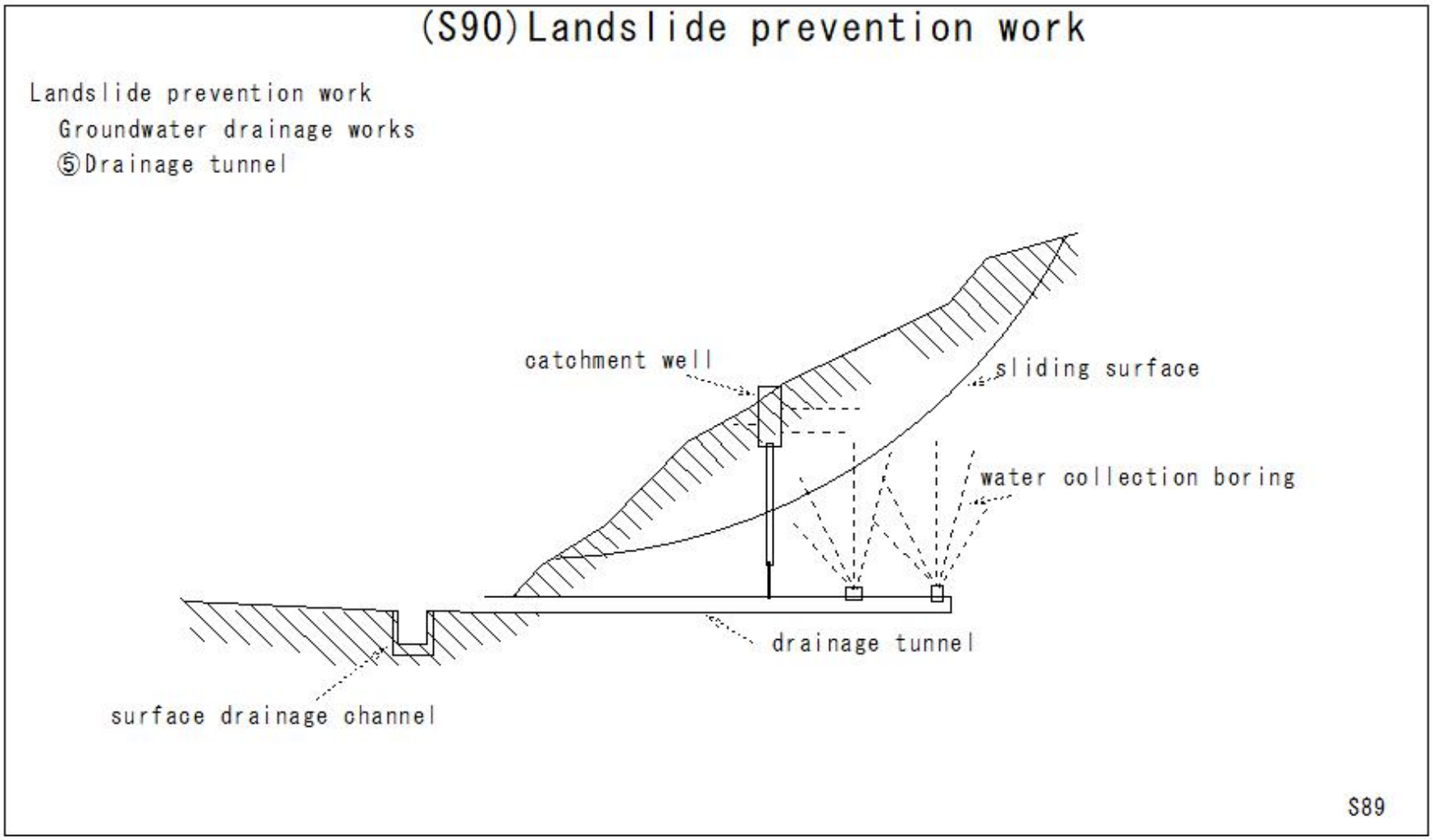
bring out groundwater



(S89)Landslide prevention work



(S90)Landslide prevention work



(S91)Landslide prevention work

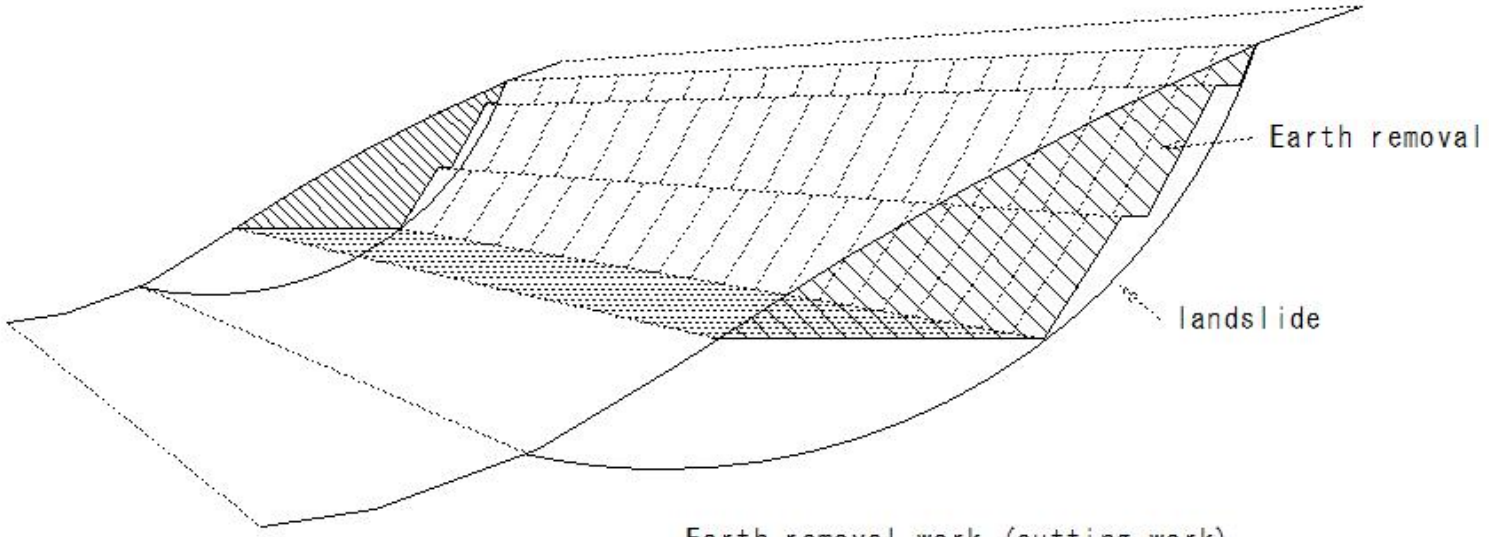
(S91)Landslide prevention work

Landslide prevention work

Earth removal work (cutting work)

- Landslide head -earth removal plan
- Multiple landslide blocks are linked in
- Top block plan
- Eliminate landslide earth and sand

Earth removal from the upper part of the slope



Earth removal work (cutting work)

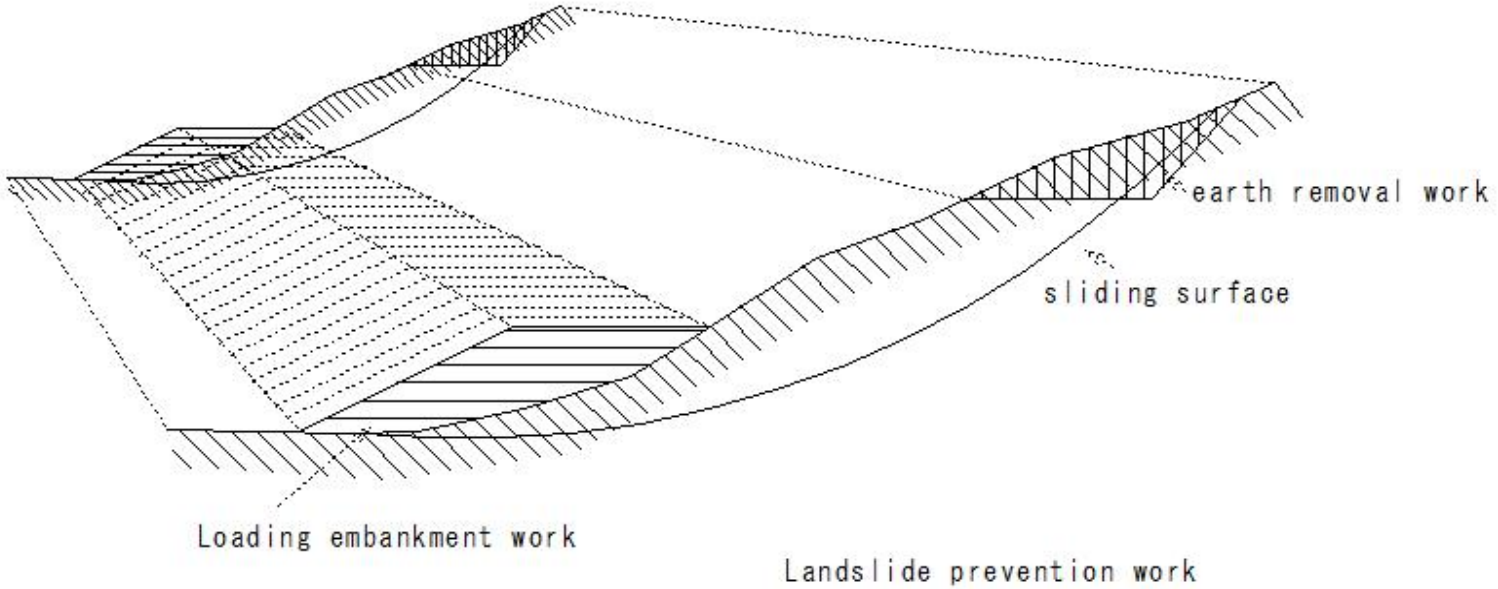
(S92)Landslide prevention work

(S92)Landslide prevention work

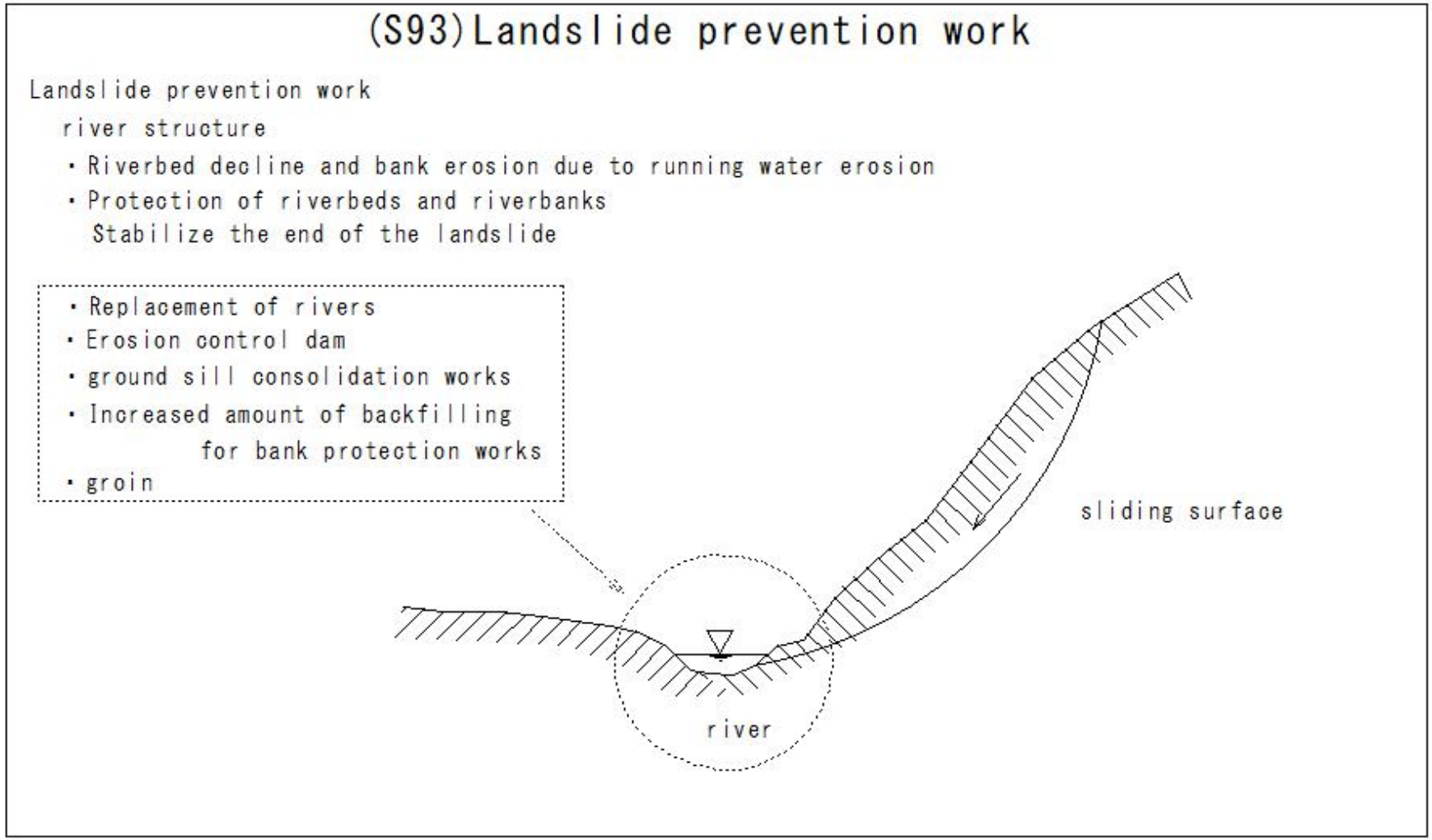
Landslide prevention work

Loading embankment work

- Landslide control works
- Planned on vacant land at the end of the landslide
- Used in conjunction with earth removal work



(S93)Landslide prevention work



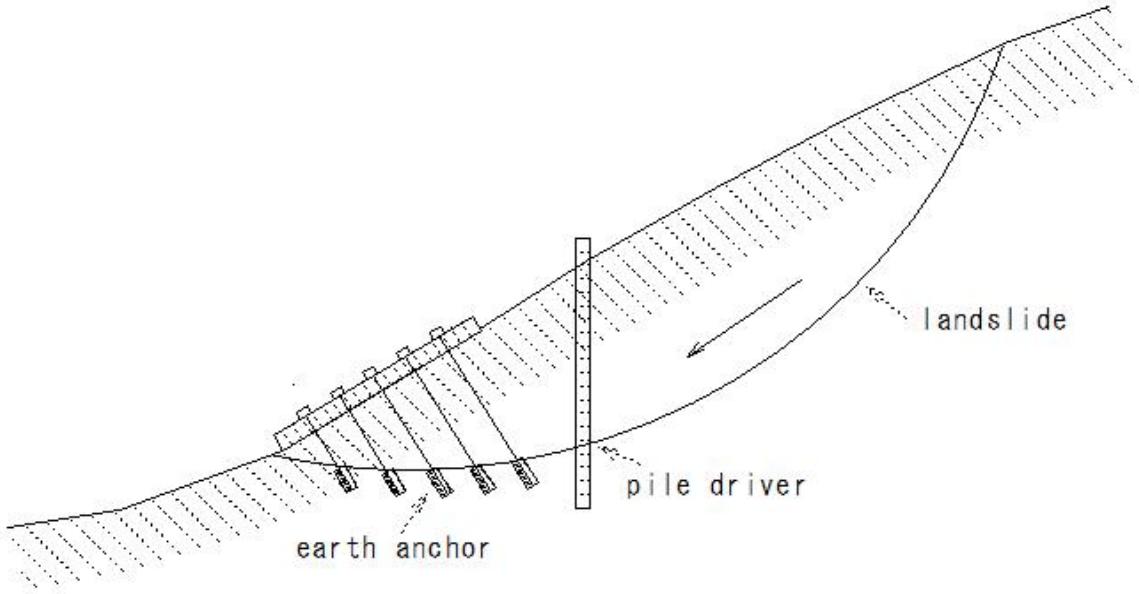
(S94)Landslide prevention work

(S94)Landslide prevention work

Landslide prevention work

pile driver

- Landslide movement 1mm/day Pile driving construction - impossible
- Position of pile driver: location where the sliding surface is about to become horizontal
- Sliding thickness - thick
- Pile length - up to 30m



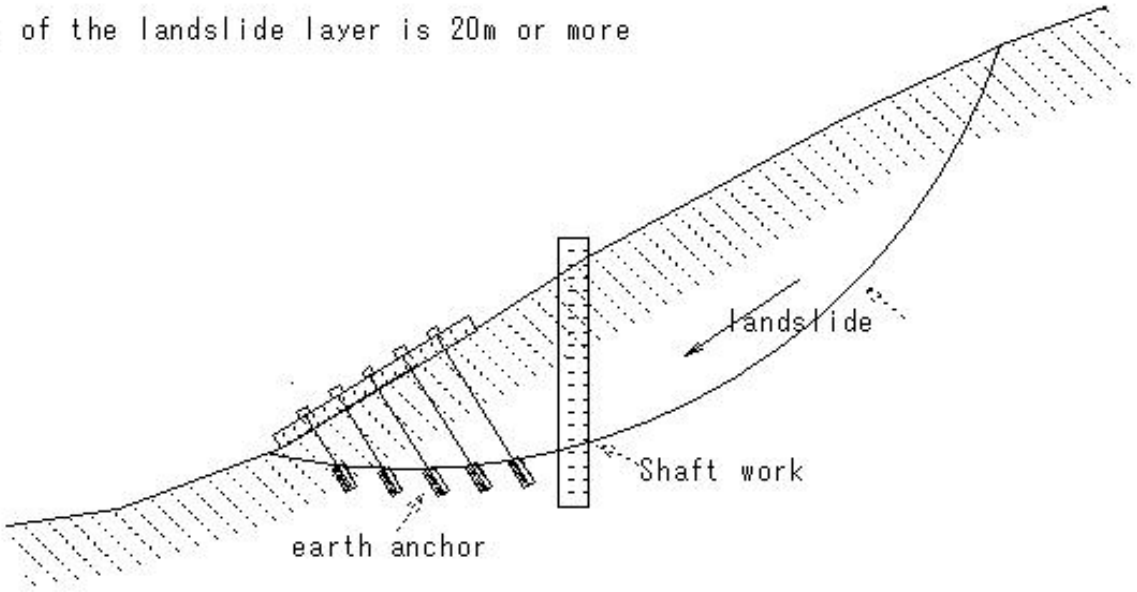
Landslide prevention work

(S95)Landslide prevention work

(S95)Landslide prevention work

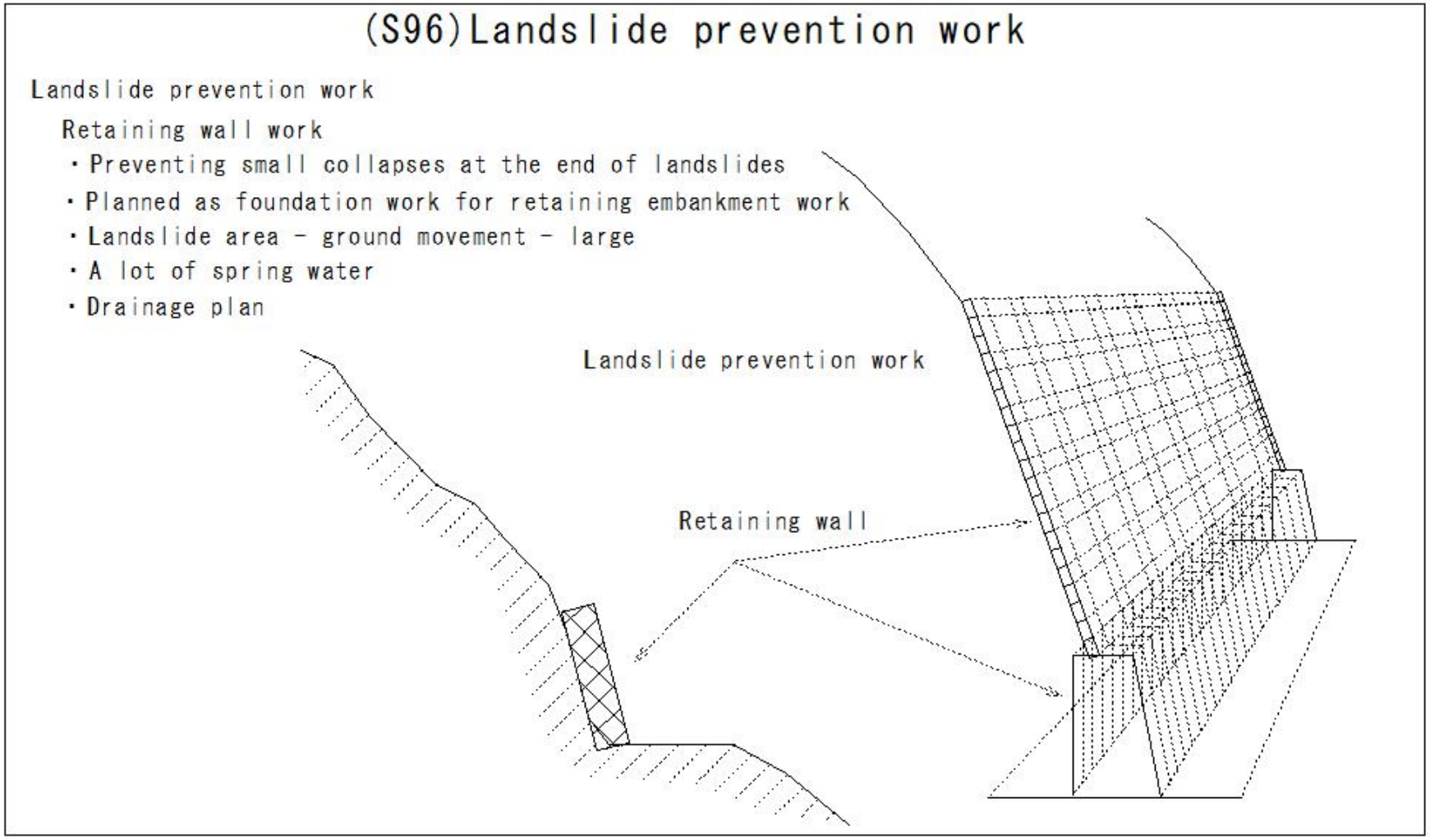
Landslide prevention work

Shaft work
- Diameter 1.5-2.5m Well
- Reinforced concrete placing in shaft
- same time construction possible
- Foundation ground - good
- Plan-case of the thickness of the landslide layer is 20m or more



Landslide prevention work

(S96)Landslide prevention work



(S97)Sabo(Erosion control)

(S97) Sabo (Erosion control)

culvert work

・Landslide prevention works

Groundwater drainage works

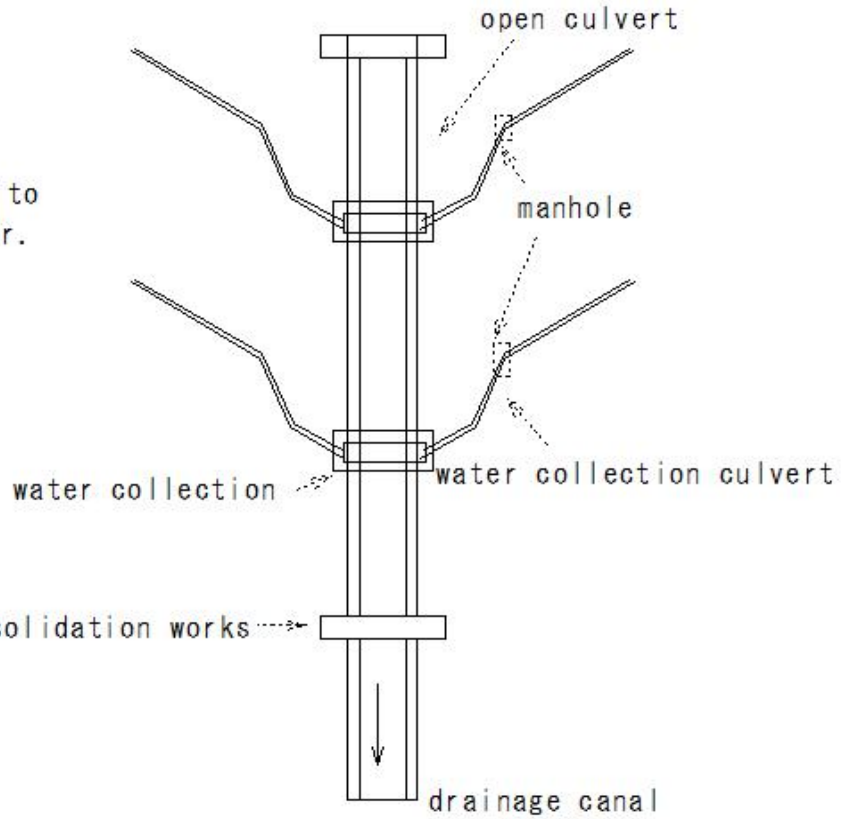
・Eliminate shallow groundwater

・Landslide stability

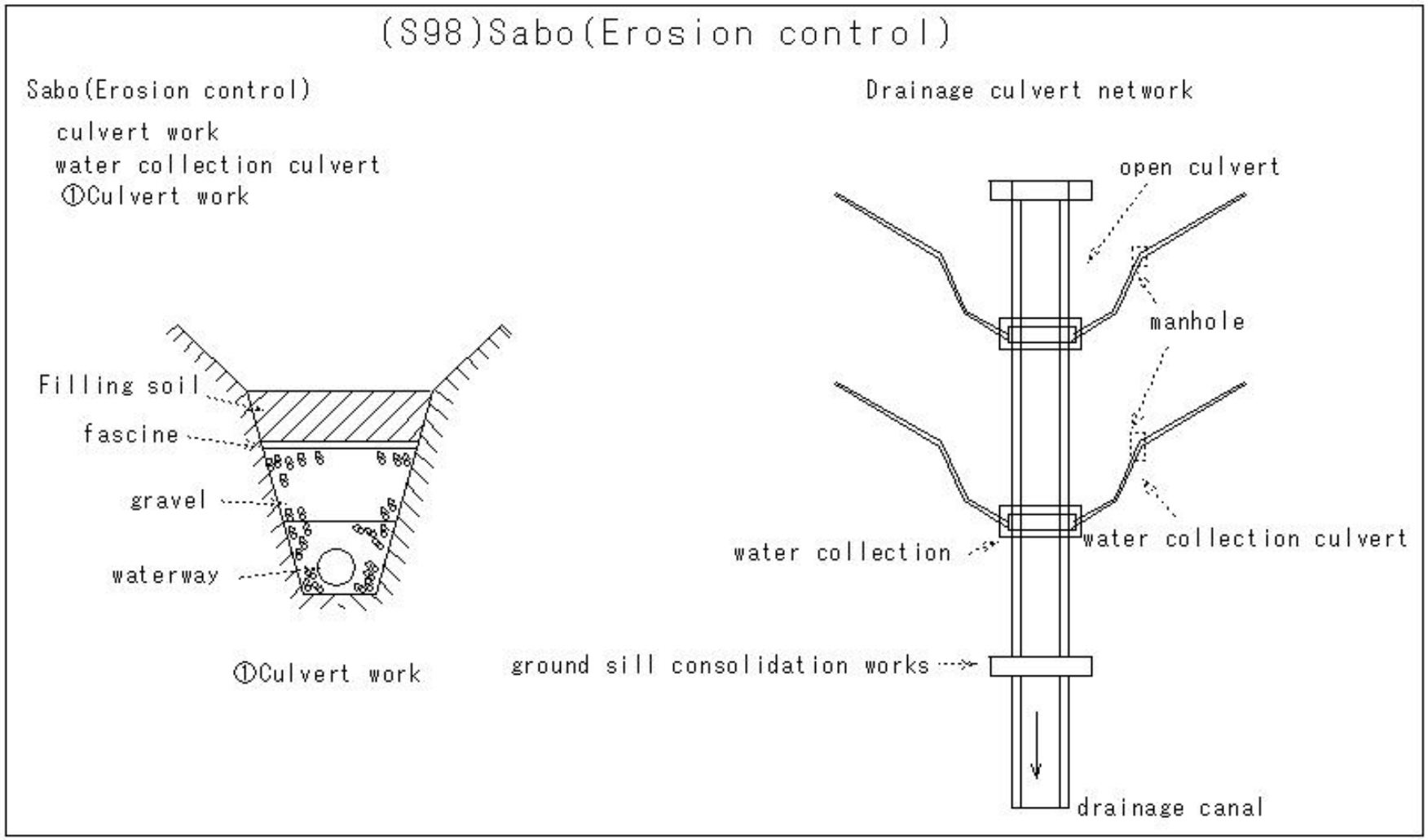
・Water culvert that collects groundwater

・Drainage culvert: Collected water is connected to the drainage channel as surface water.

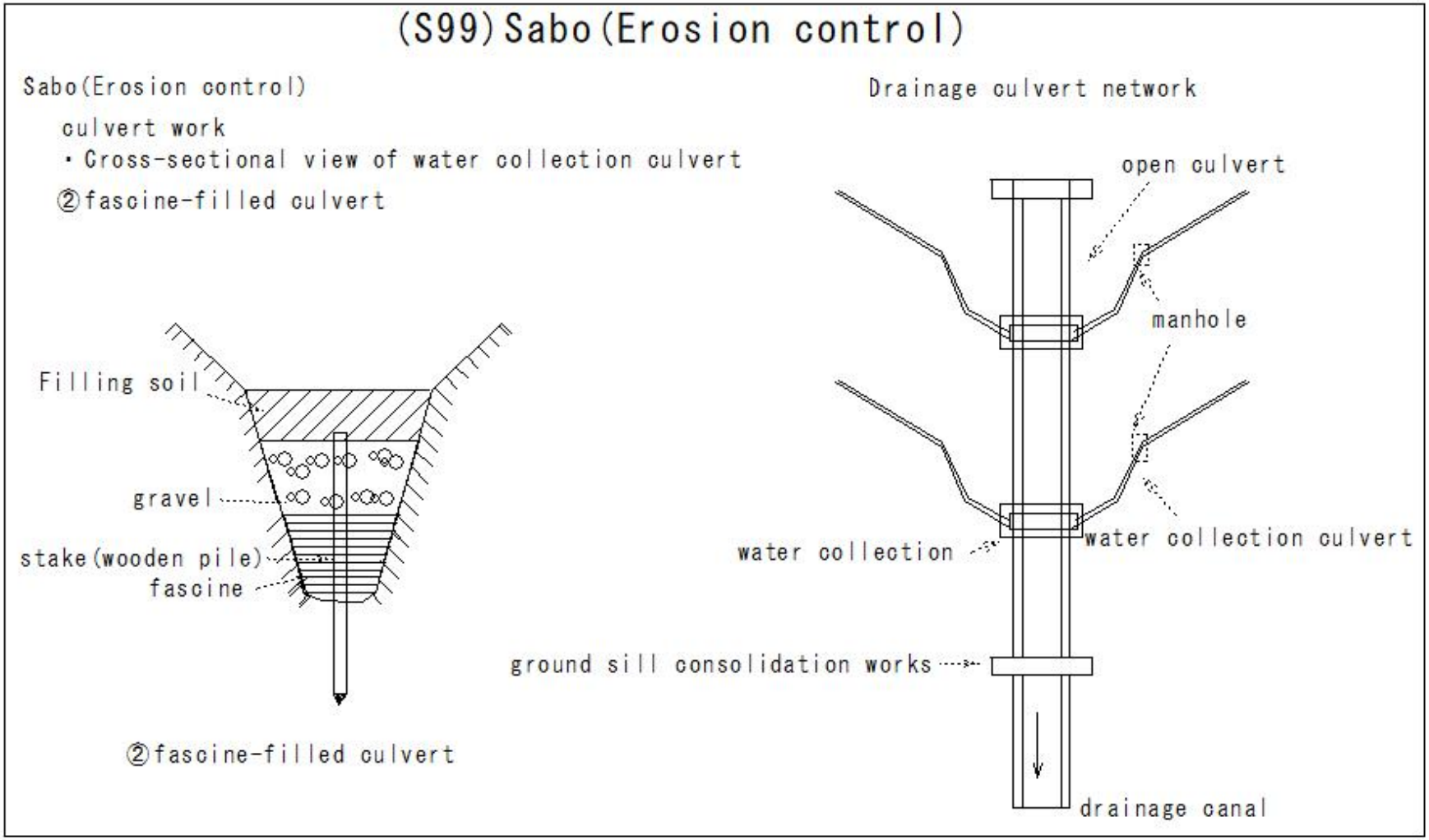
Drainage culvert network



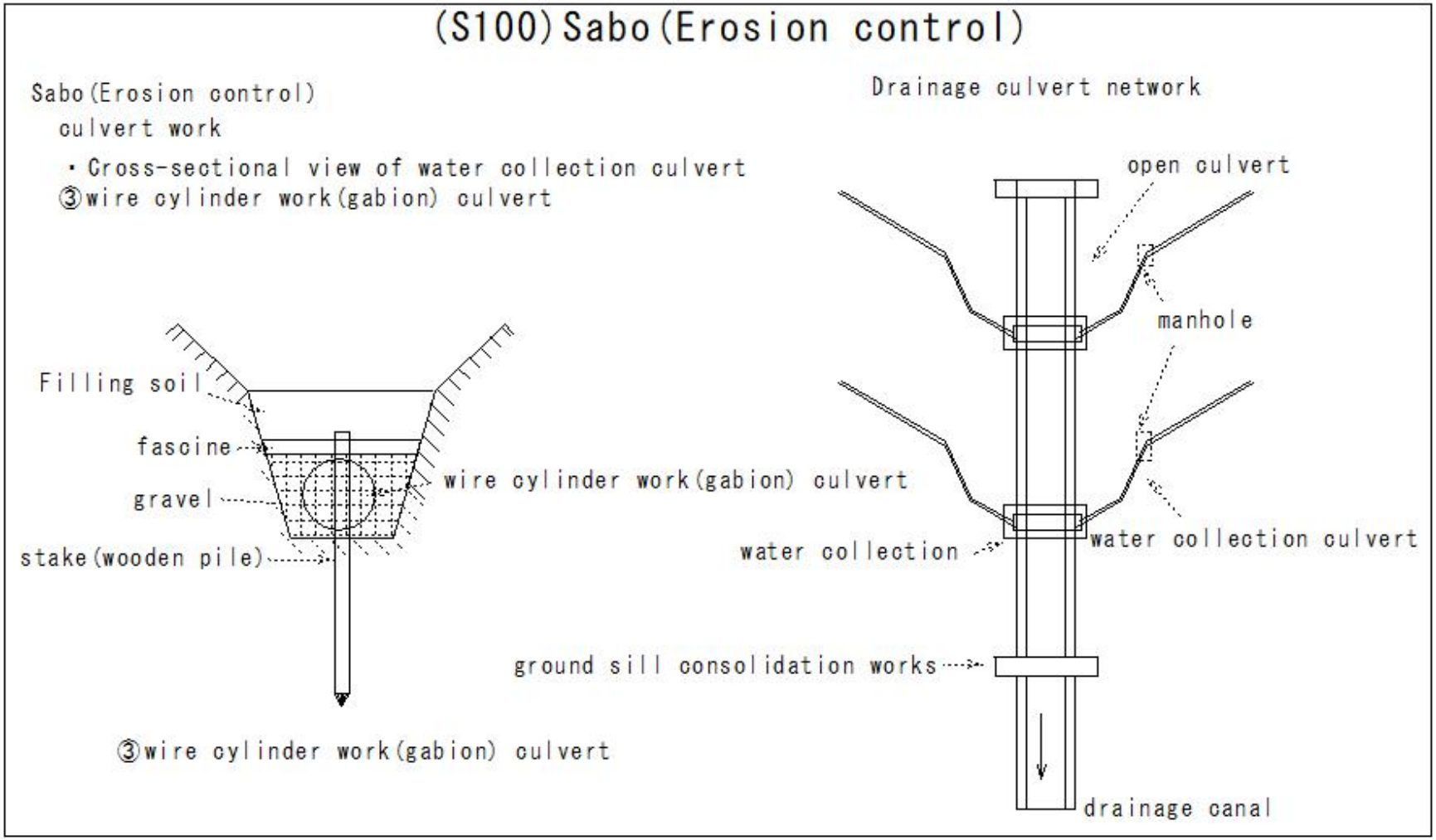
(S98)Sabo(Erosion control)



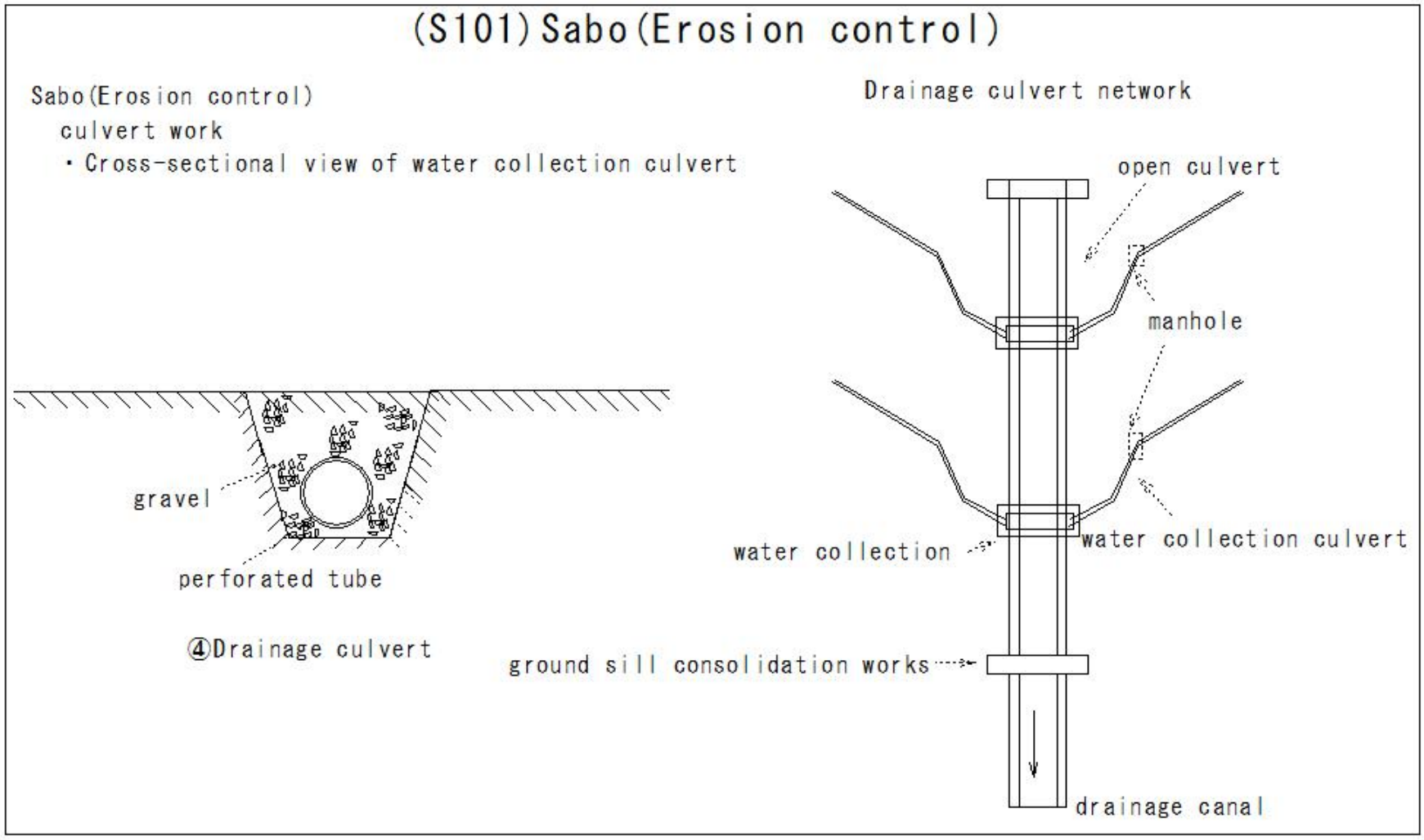
(S99)Sabo(Erosion control)



(S100)Sabo(Erosion control)



(S101)Sabo(Erosion control)



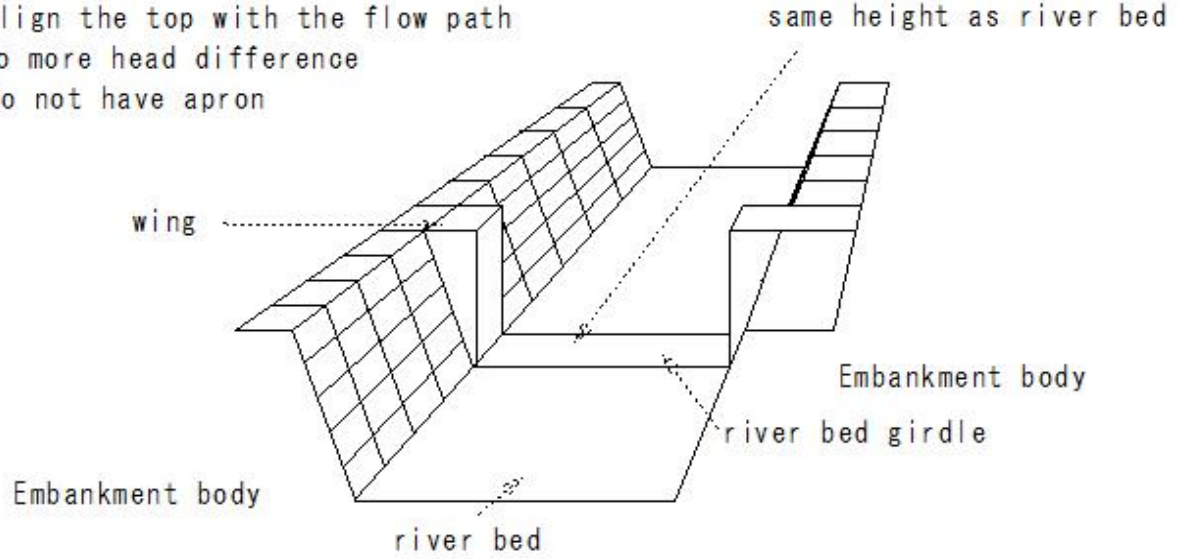
(S102)Sabo(Erosion control)

(S102)Sabo(Erosion control)

Sabo(Erosion control)

river bed girdle

- A type of ground sill consolidation works
- Preventing riverbed scouring
- Stabilize the slope of the river channel
- Do not lower the river bed
- Align the top with the flow path
- No more head difference
- Do not have apron



(S103)Sabo(Erosion control)

(S103)Sabo(Erosion control)

Sabo(Erosion control)

Steep slope collapse prevention work

・Landslide prevention works

・landslide control works

①Surface water drainage works

②Groundwater drainage works

③Vegetation work

④Spraying

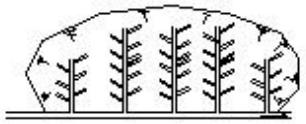
⑤stone pitching

⑥crib work

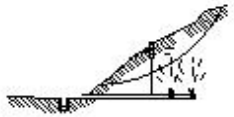
⑦Cutting work

⑧Loading embankment work

①Surface water drainage works



②Groundwater drainage works



S84

S90

③Vegetation work

④Spraying

S78

S80

⑤stone pitching

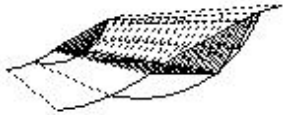
⑥crib work

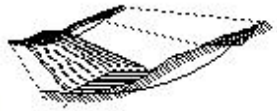
S75

S96

⑦Cutting work

⑧Loading embankment work





S91

S92

(S104)Sabo(Erosion control)-landslide restraining works

(S104)Sabo(Erosion control)-landslide restraining works

Sabo(Erosion control)

Steep slope collapse prevention work

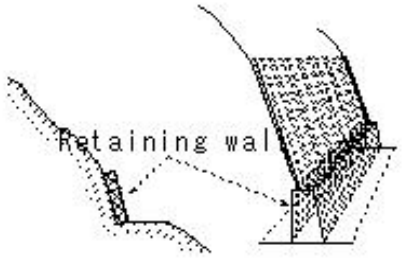
landslide restraining works

① Retaining wall work

②Anchor work

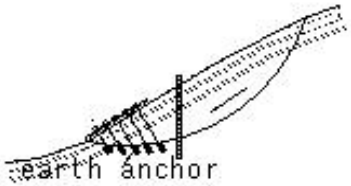
③Pilework

① Retaining wall work



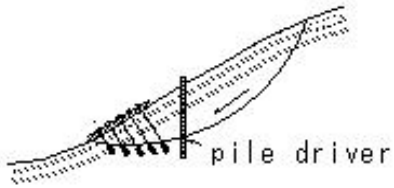
S96

②Anchor work



S94

③Pilework



S94

(S105)Sabo(Erosion control)-landslide restraining works

(S105)Sabo(Erosion control)-landslide restraining works

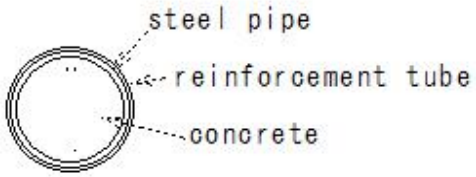
Sabo(Erosion control)

Steep slope collapse prevention work

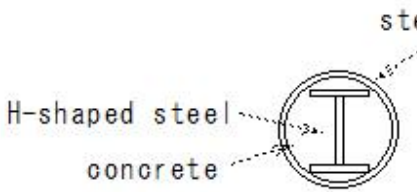
- Landslide prevention works
- landslide restraining works

Pilework

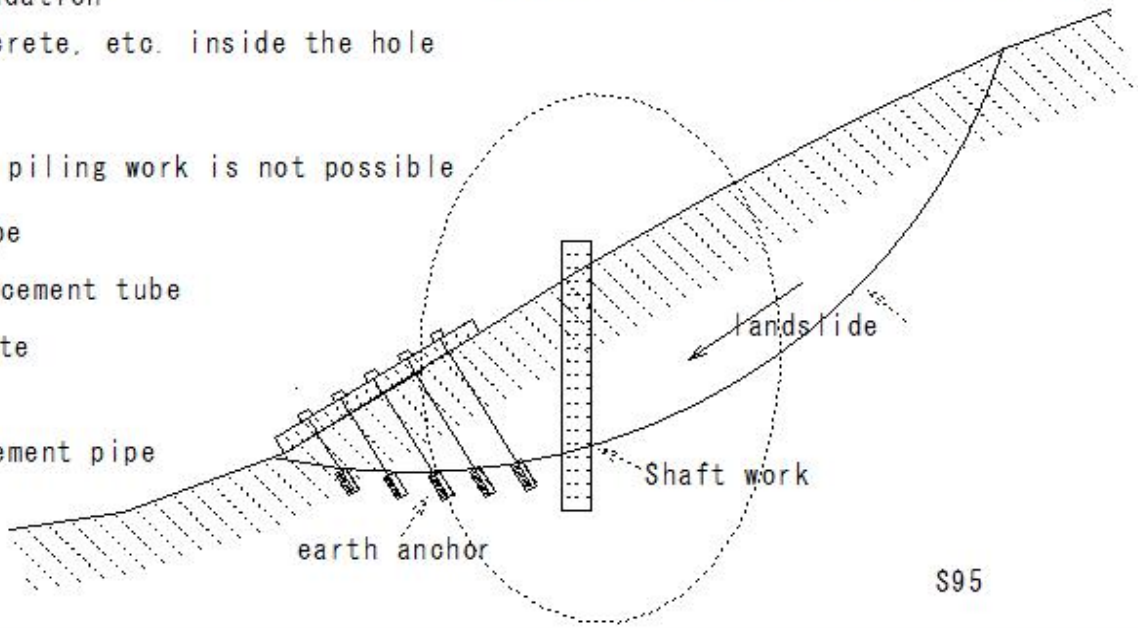
- Large diameter boring (30-50cm diameter)
- Excavation inside the foundation
- Made with steel pipe, concrete, etc. inside the hole
- Landslide slope stability
- Pile length up to 30m
- Landslide of 1mm per day, piling work is not possible



Steel pipe pile with reinforcement pipe



H-shaped steel inserted steel pipe pile



S95

(S106)check dam(erosion control dam)

(S106)check dam(erosion control dam)

check dam(erosion control dam)

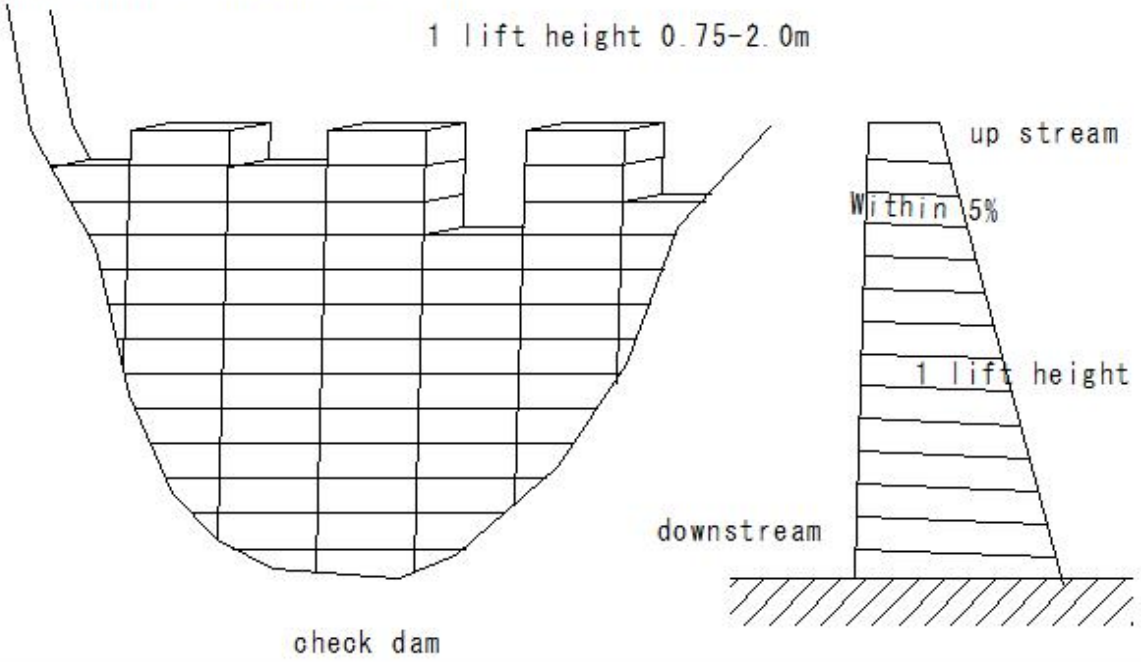
・Concrete placement

①Adhesion to bedrock

②Bedrock cleaning

③2.0cm thick mortar

④New and old concrete pouring joint 1.5cm mortar bed



S38

(S107)check dam(erosion control dam)

(S107)check dam(erosion control dam)

check dam(erosion control dam)

- Concrete placement
- Placing order

Block division (dam axis direction 15m standard)

- Placing from a low point
- From the upstream side to the downstream side

Slope within 5%

- Prevention of cracks

1 lift: 0.75-1.5m standard

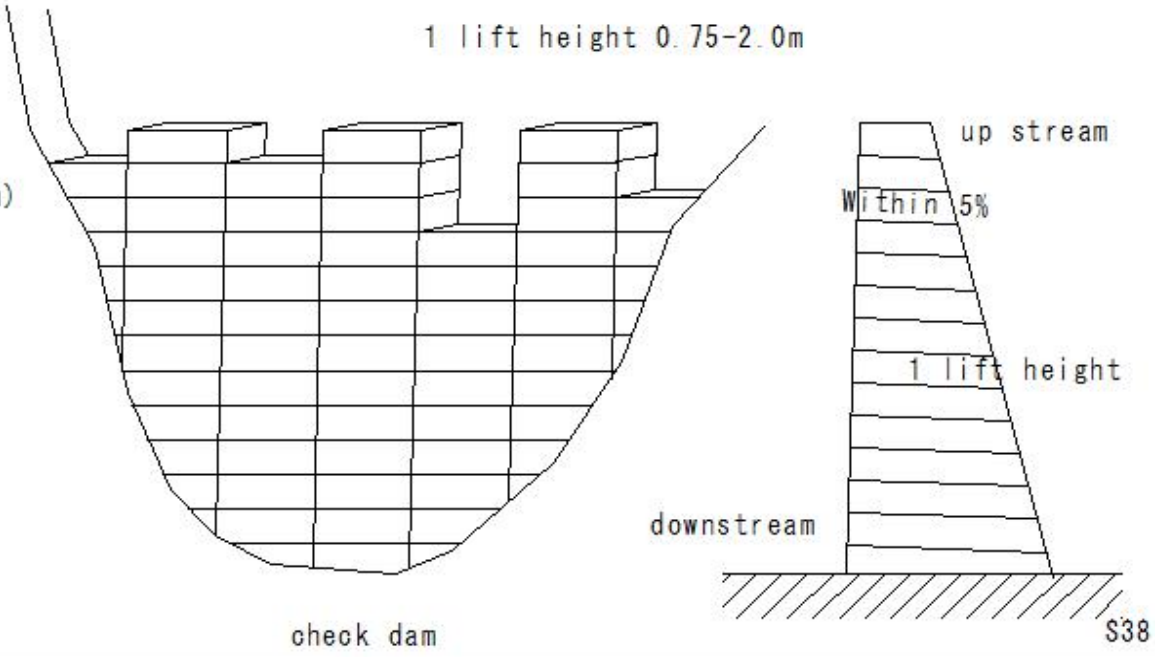
lift height

check dam(erosion control dam)

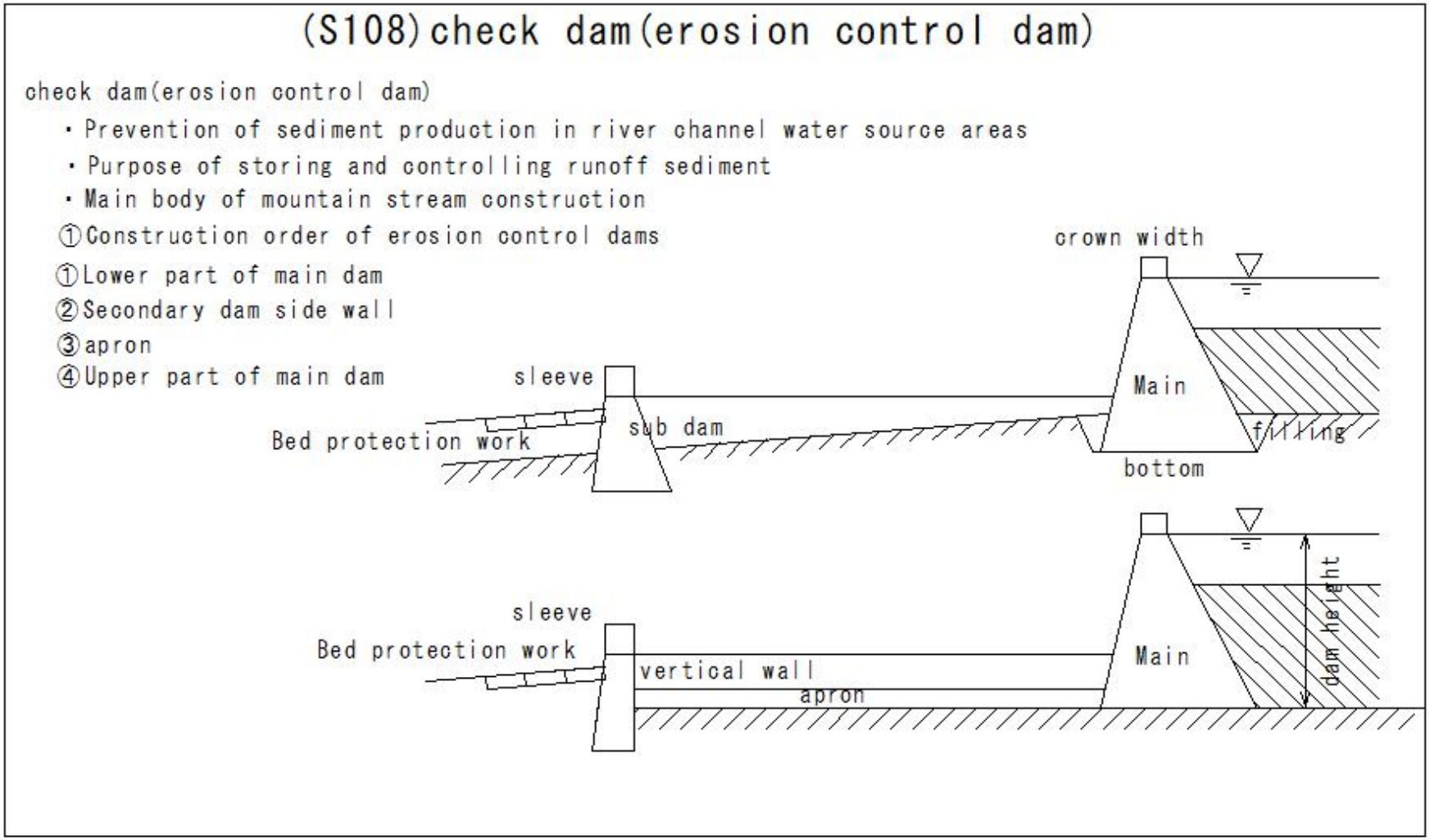
1 lift height 0.75-1.5m

placing surface slope

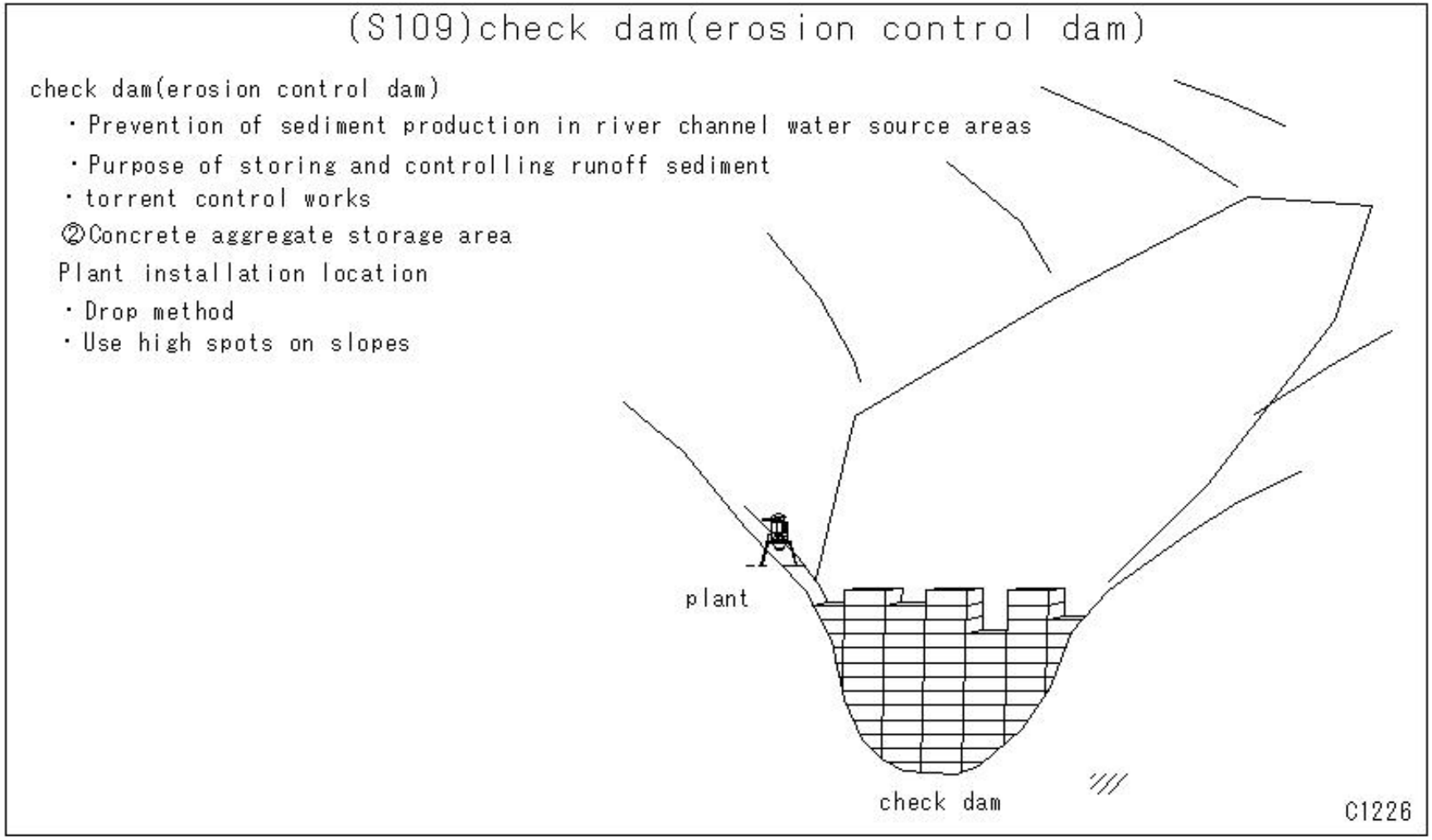
Within 5%



(S108)check dam(erosion control dam)



(S109)check dam(erosion control dam)



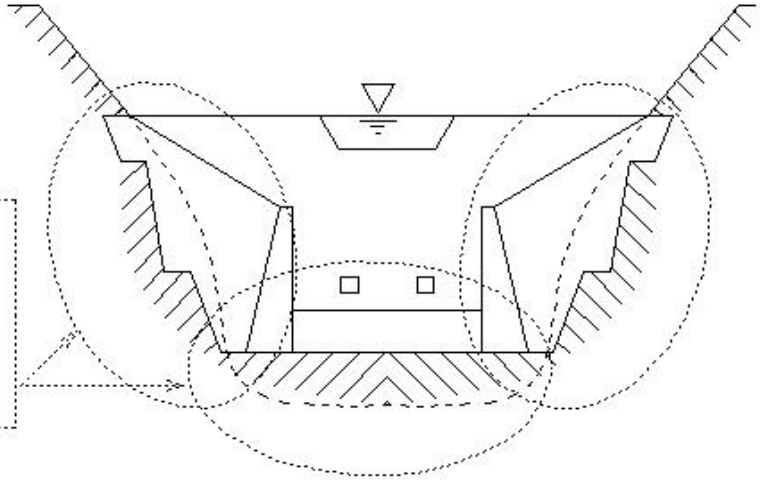
(S110)check dam(erosion control dam)

(S110)check dam(erosion control dam)

check dam(erosion control dam)

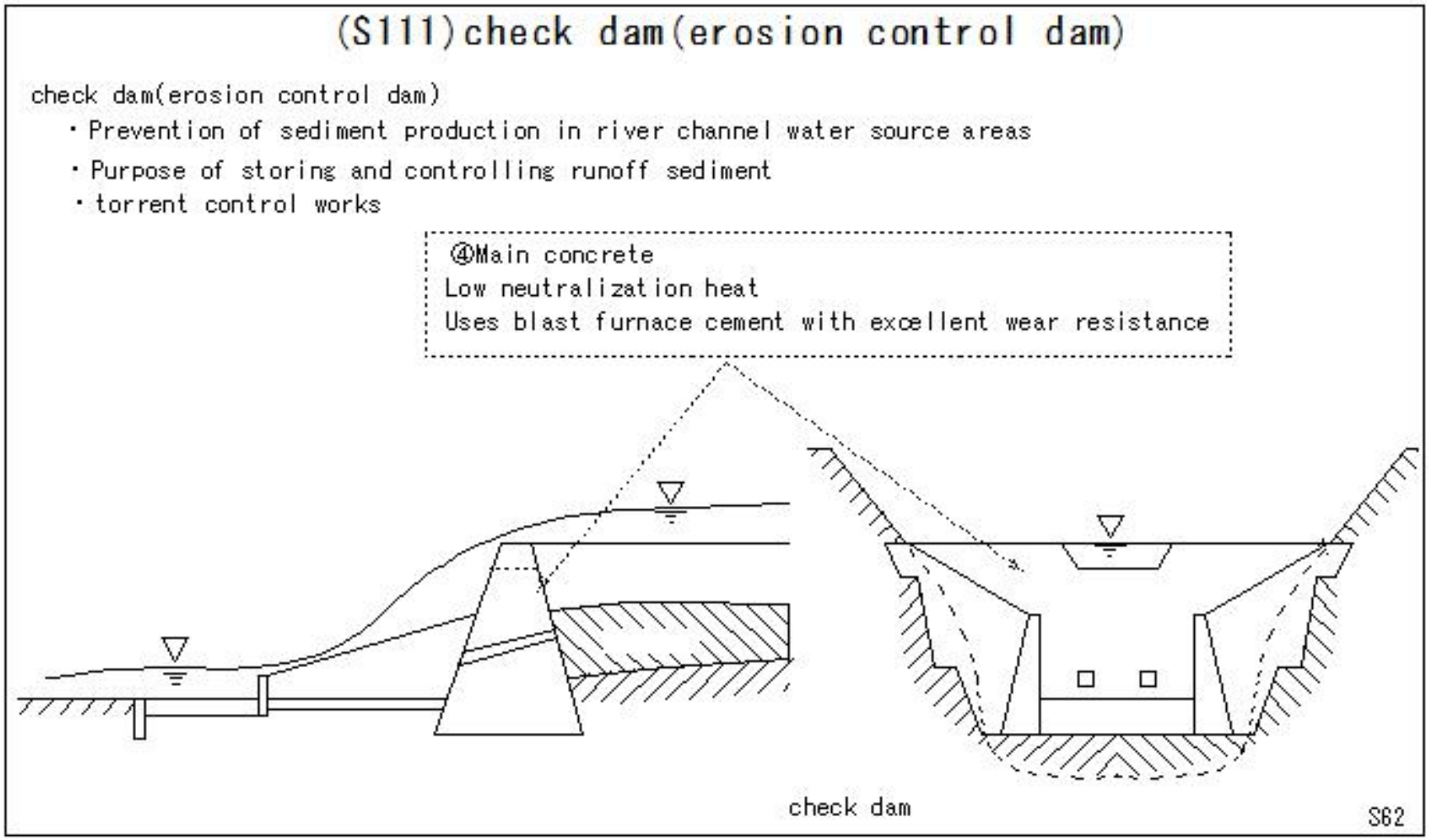
- Prevention of sediment production in river channel water source areas
- Purpose of storing and controlling runoff sediment
- torrent control works

③After completion of excavation
Prior to concrete placing
mud on bedrock
dust
remove standing water



check dam(erosion control dam)

(S111)check dam(erosion control dam)



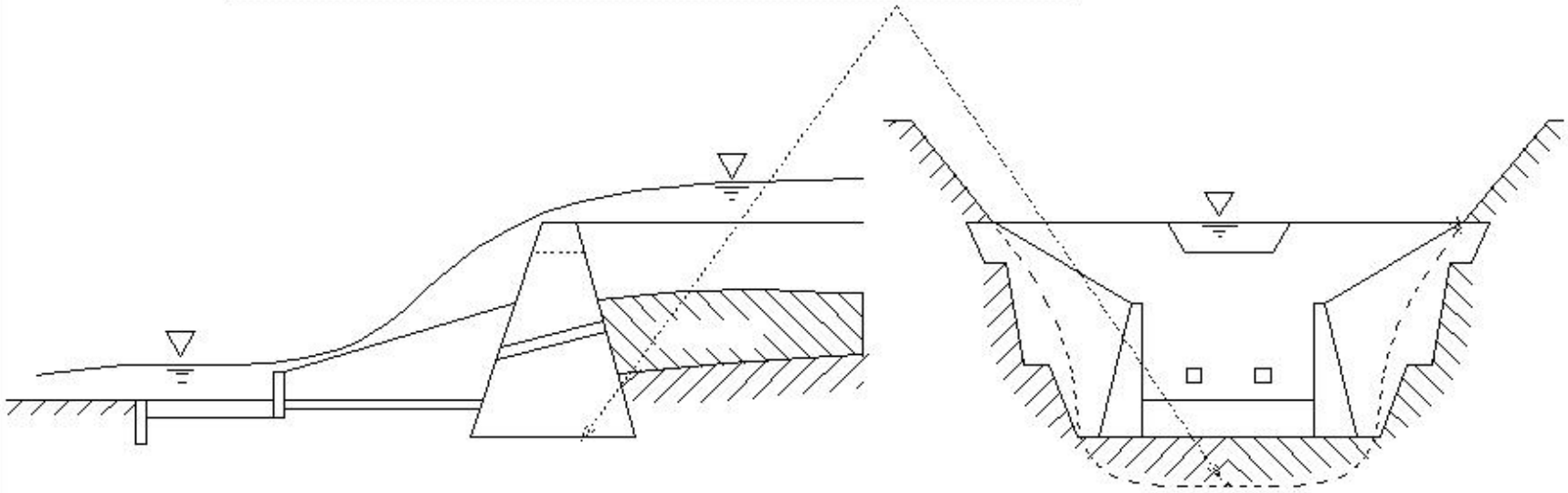
(S112)check dam(erosion control dam)

(S112)check dam(erosion control dam)

check dam(erosion control dam)

- Prevention of sediment production in river channel water source areas
- Purpose of storing and controlling runoff sediment
- torrent control works

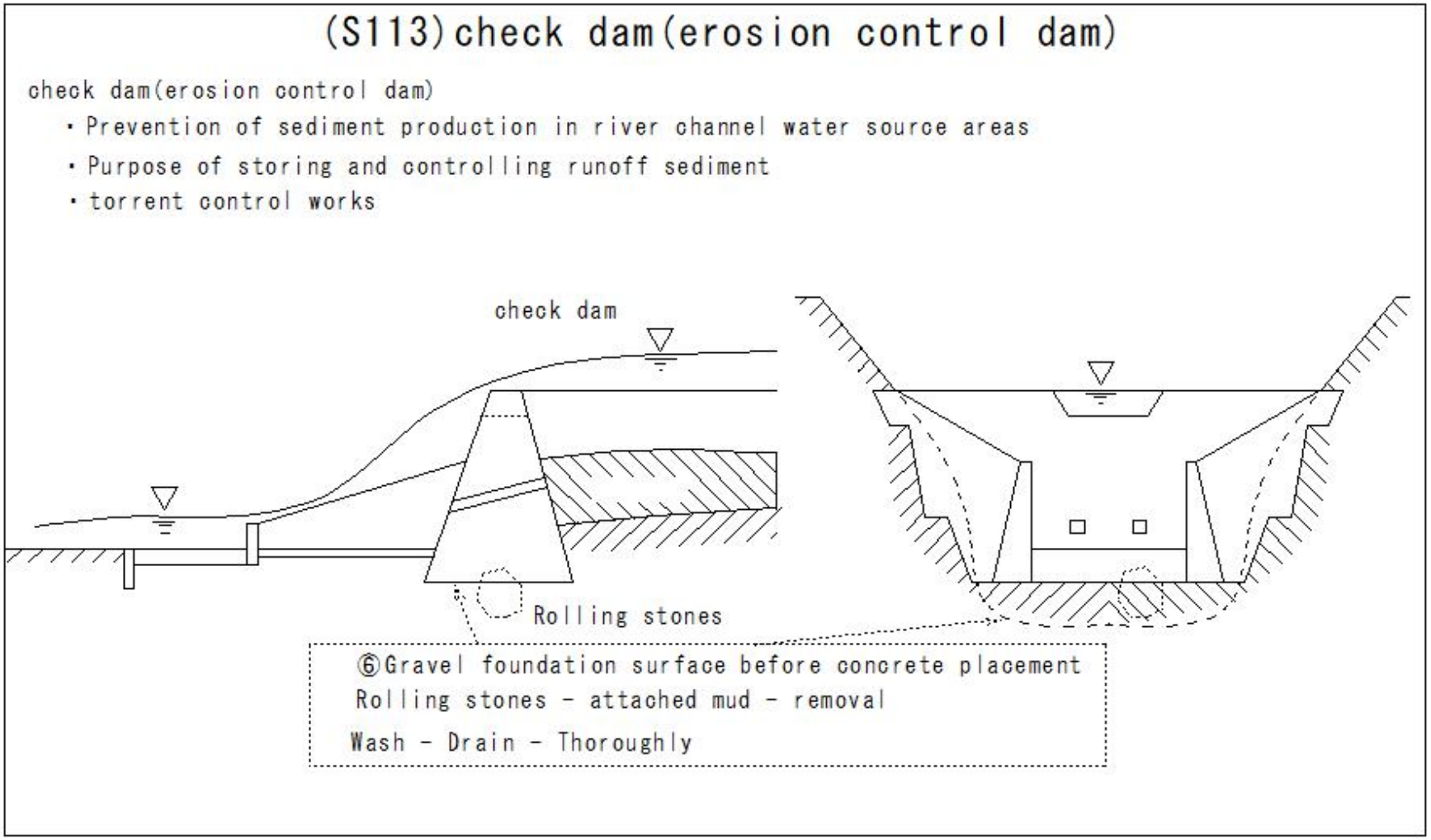
⑤Bedrock foundation surface before concrete pouring
wet condition



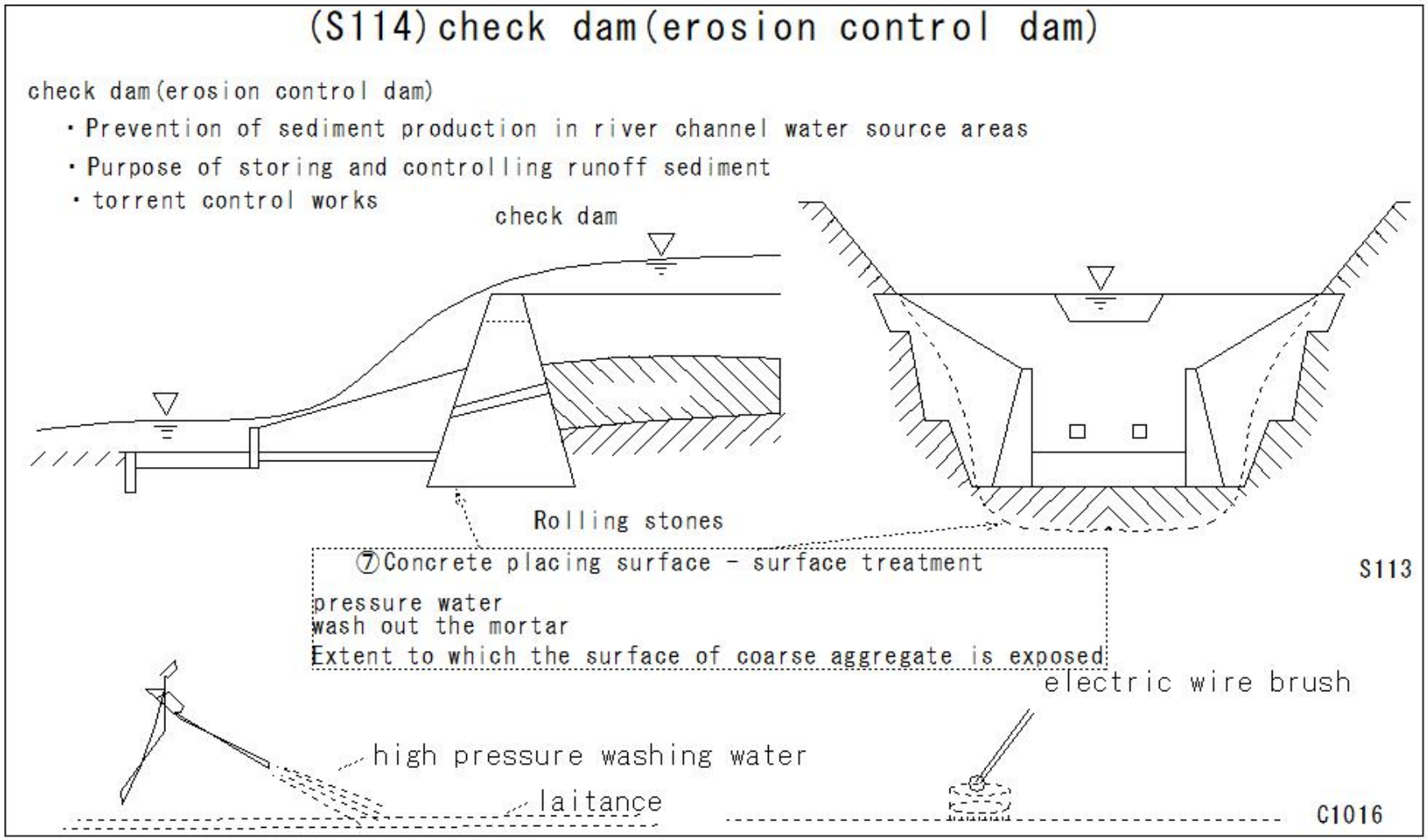
check dam

S62

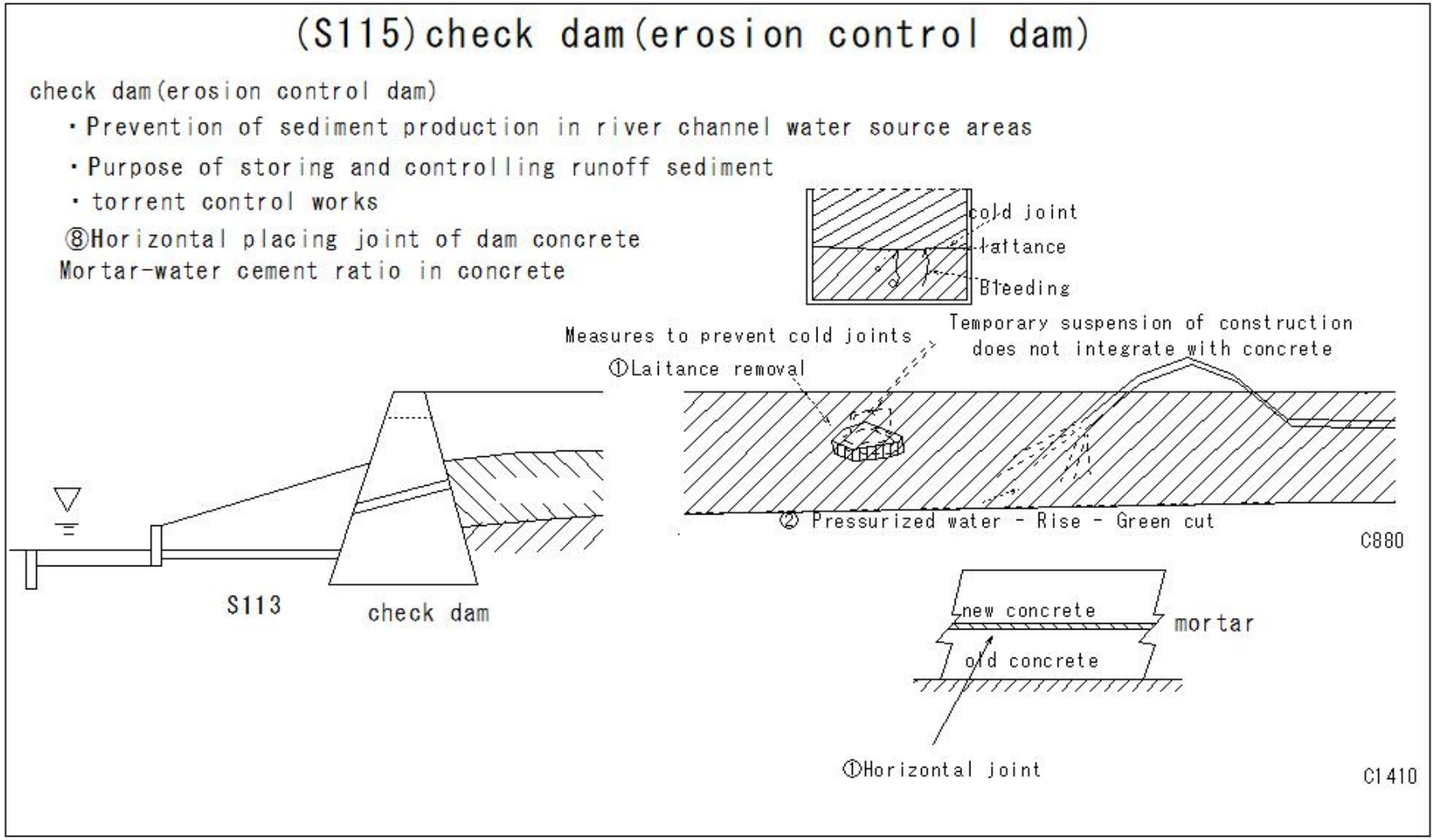
(S113)check dam(erosion control dam)



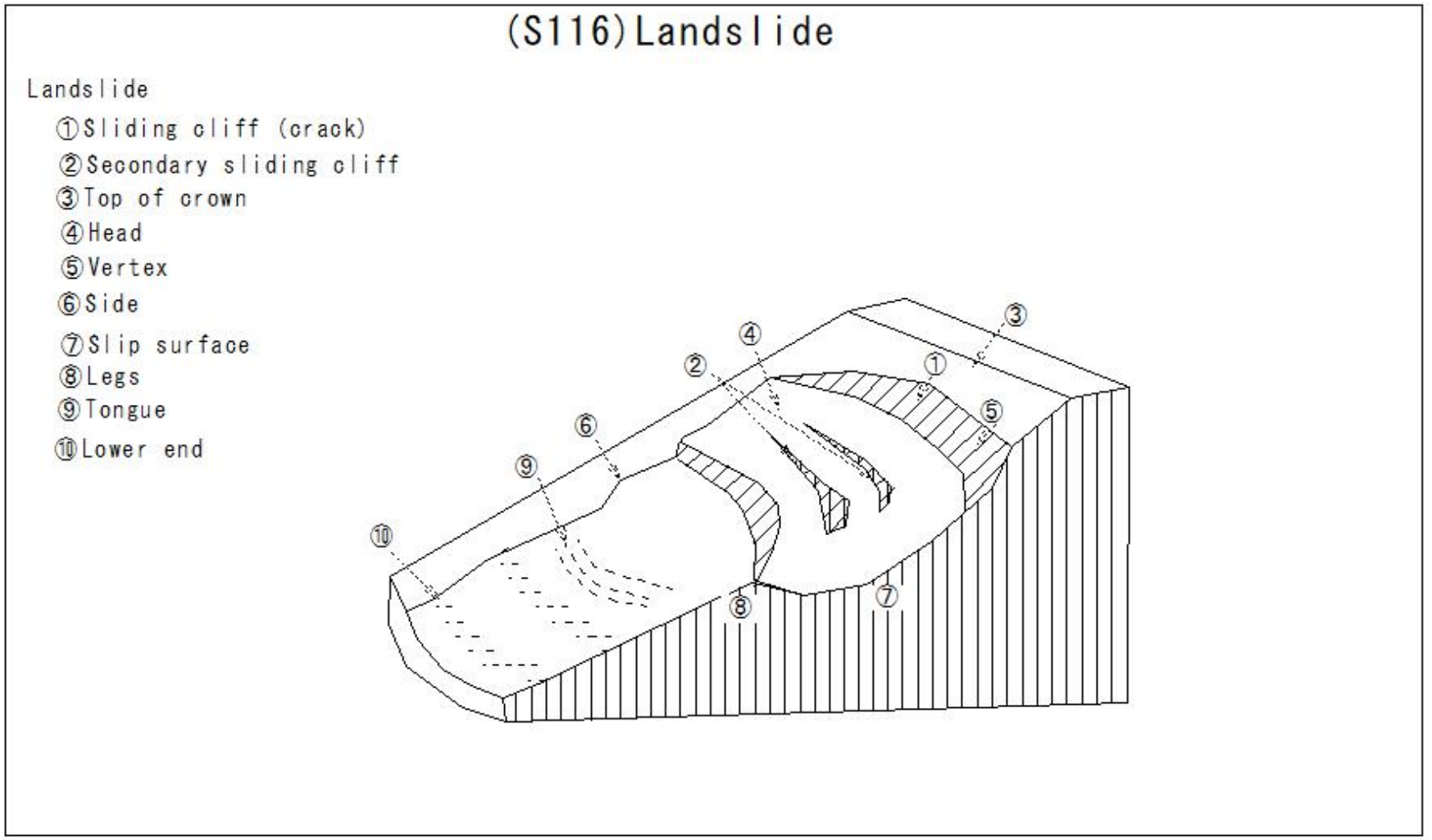
(S114)check dam(erosion control dam)



(S115)check dam(erosion control dam)



(S116)Landslide



(S117)Landslide prevention method

(S117)Landslide prevention method

Landslide prevention method

①landslide control works- main

②Surface water drainage works-waterway-Penetration prevention work

③Groundwater drainage works

④Shallow groundwater drainage works

⑤open culvert-culvert work-Horizontal boring

⑥Groundwater isolation work

⑦Deep groundwater drainage works-horizontal boring-catchment well-drainage tunnel construction

⑧Earth removal work

⑨Loading embankment work

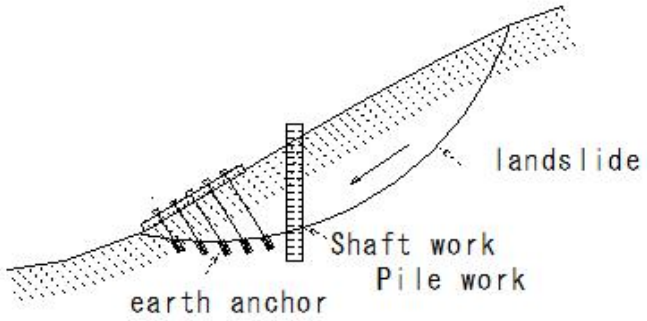
⑩River structures-Weir work-ground sill consolidation works-groin-revetment

(S118)Landslide prevention method

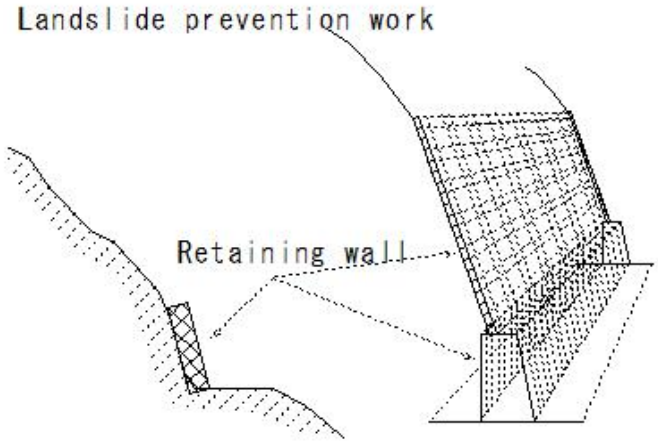
(S118)Landslide prevention method

Landslide prevention method

⑪landslide restraining works
⑫Pile work
⑬Shaft work
⑭Anchor work
⑮Retaining wall work

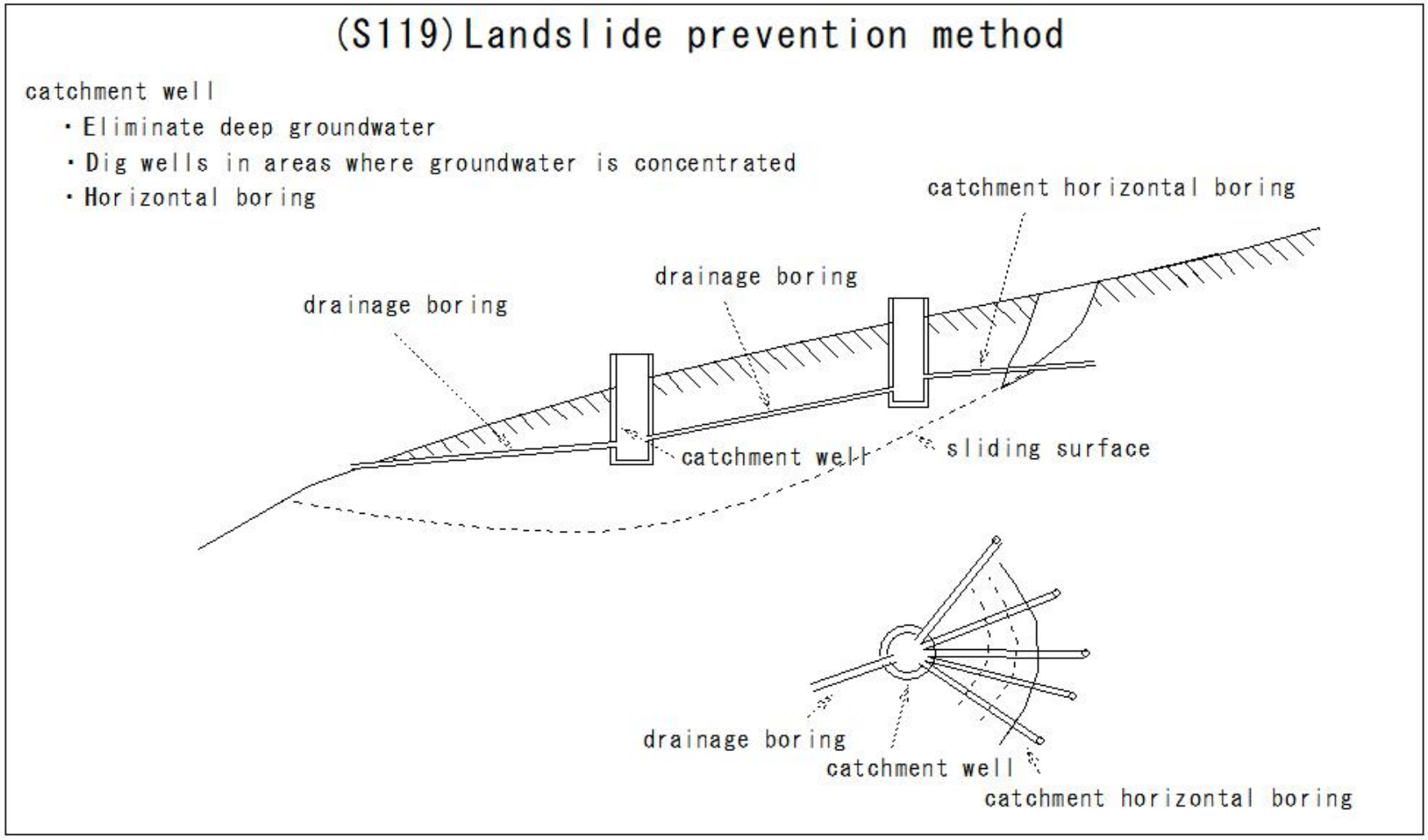


S95

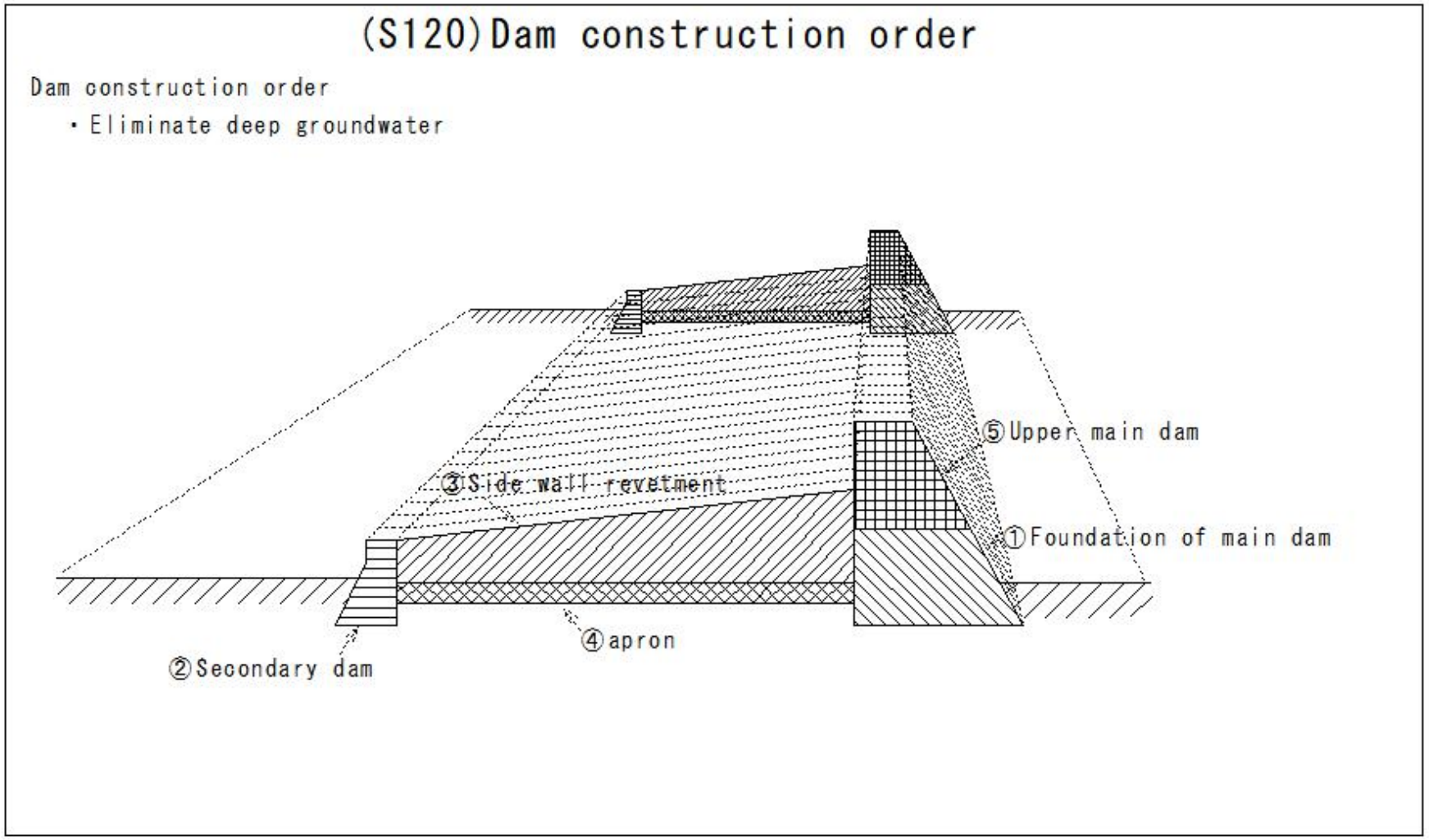


S96

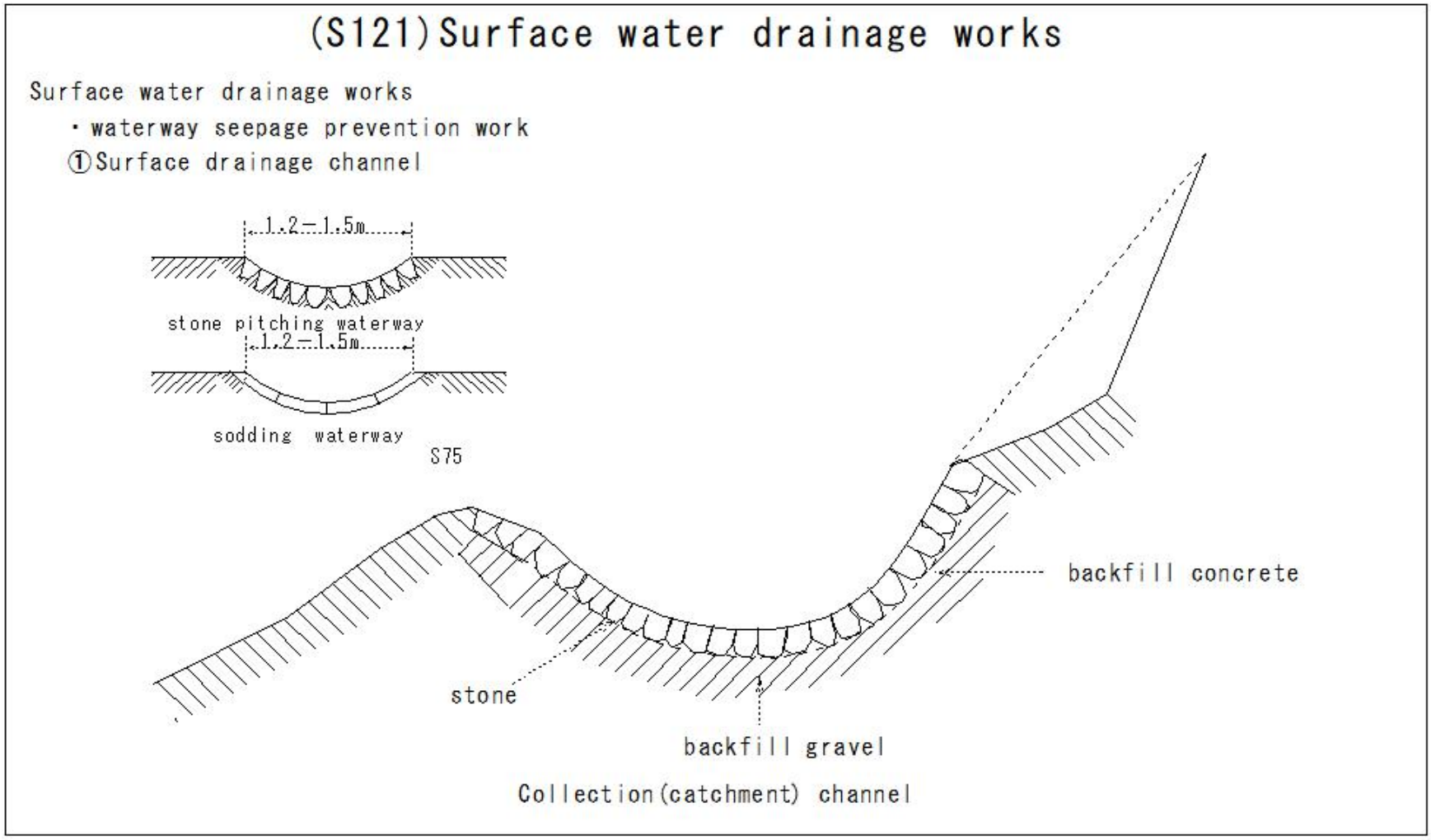
(S119)Landslide prevention method



(S120)Dam construction order



(S121)Surface water drainage works



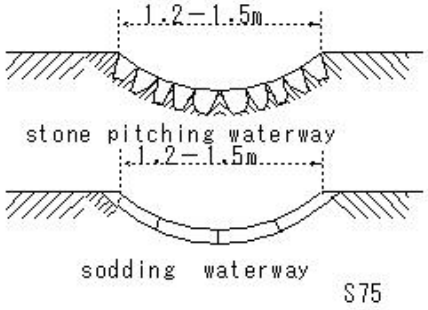
(S122)Surface water drainage works

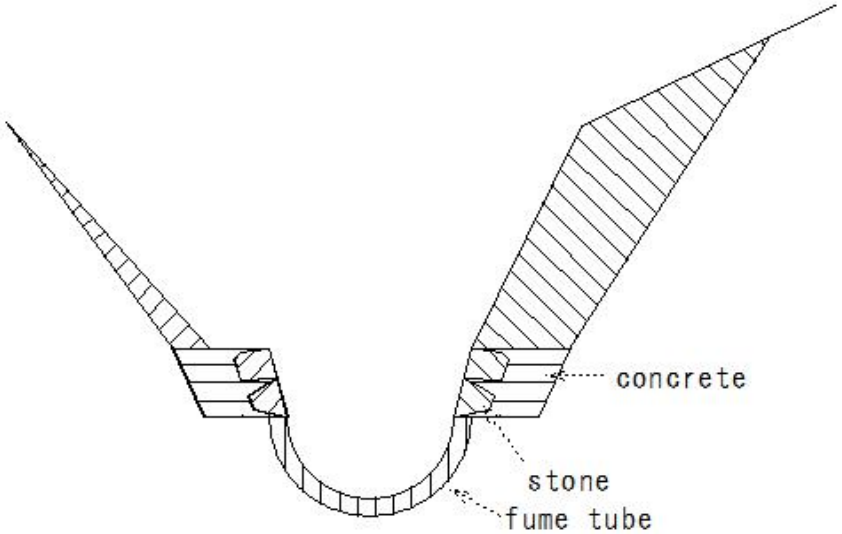
(S122)Surface water drainage works

Surface water drainage works

・waterway seepage prevention work

②Surface drainage channel

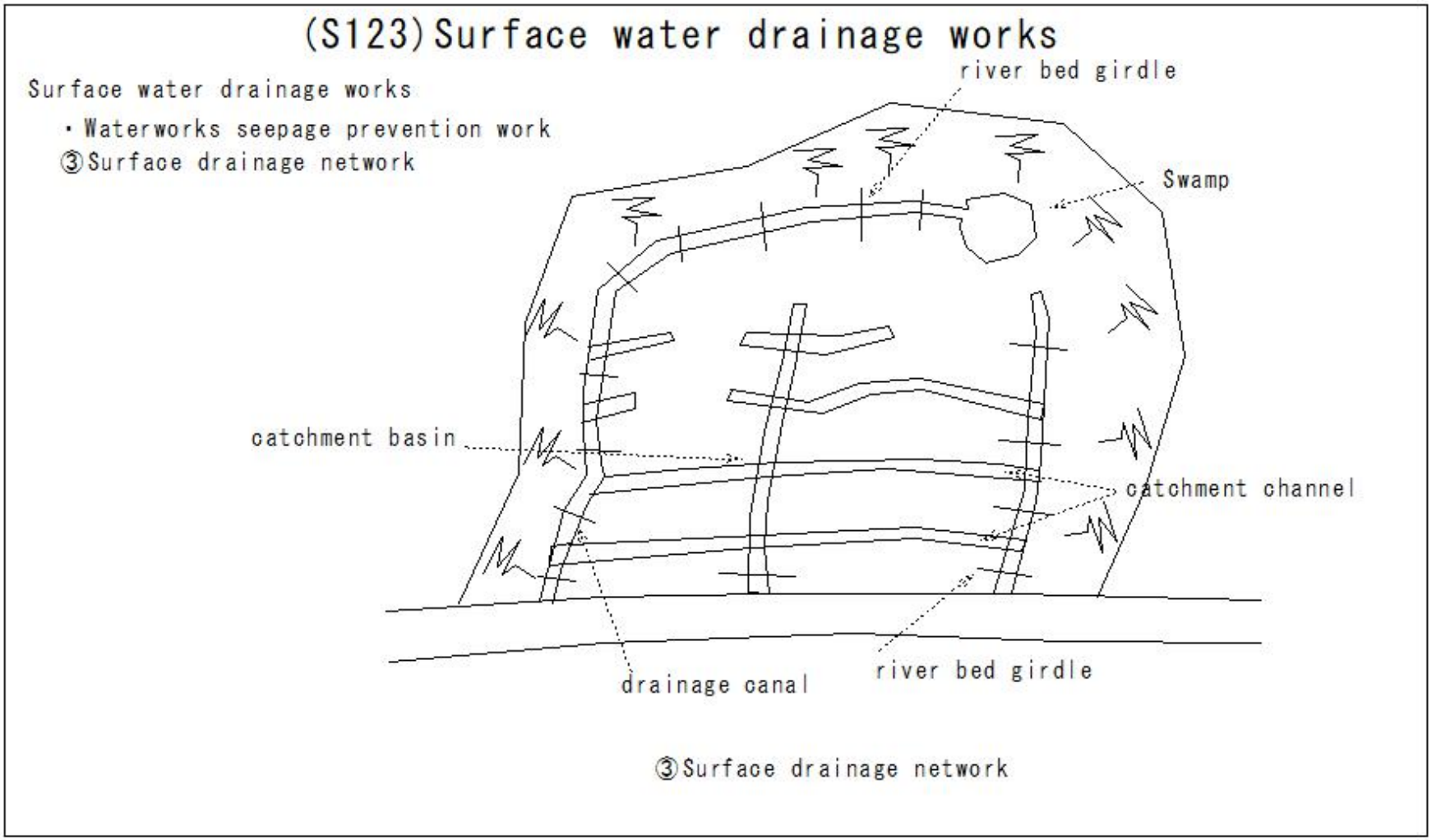




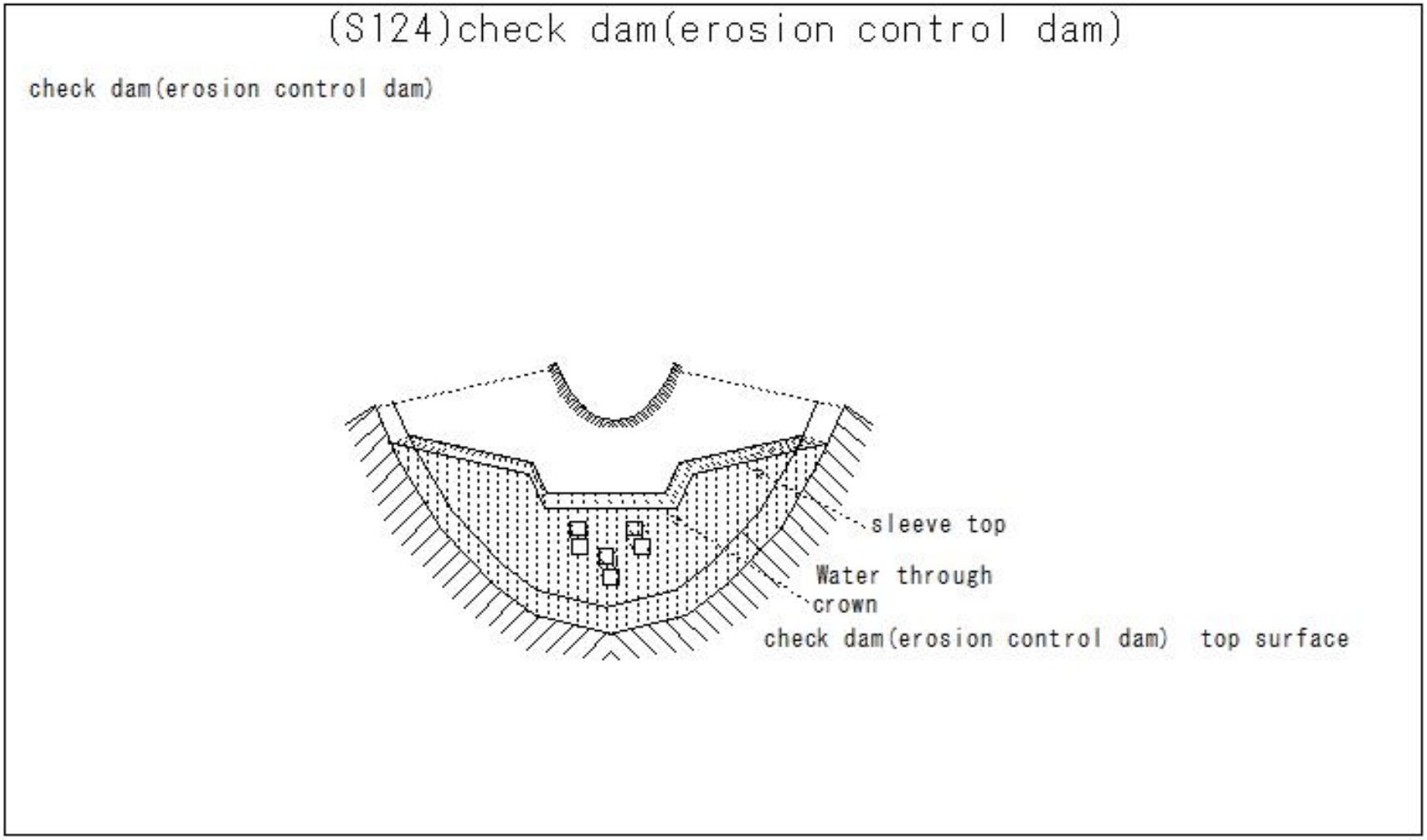
drainage canal

Collection(catchment) channel

(S123)Surface water drainage works



(S124)check dam(erosion control dam)



(S125)ground sill consolidation works

(S125)ground sill consolidation works

ground sill consolidation works

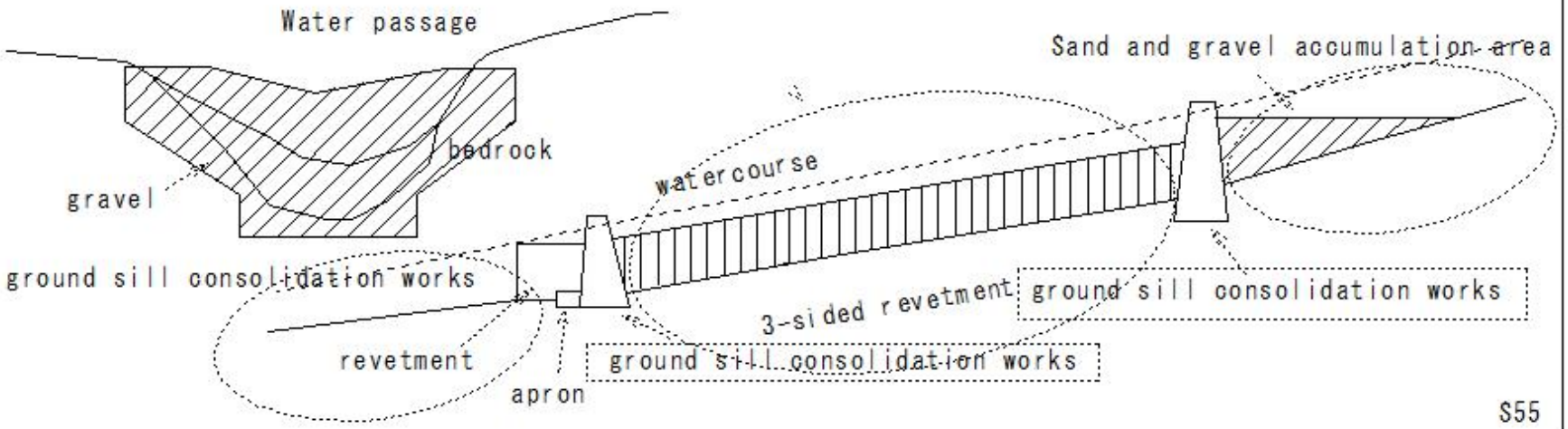
・Main structure of mountain stream construction

River bed/bank protection maintenance

Horizontal structure (horizontal structure)

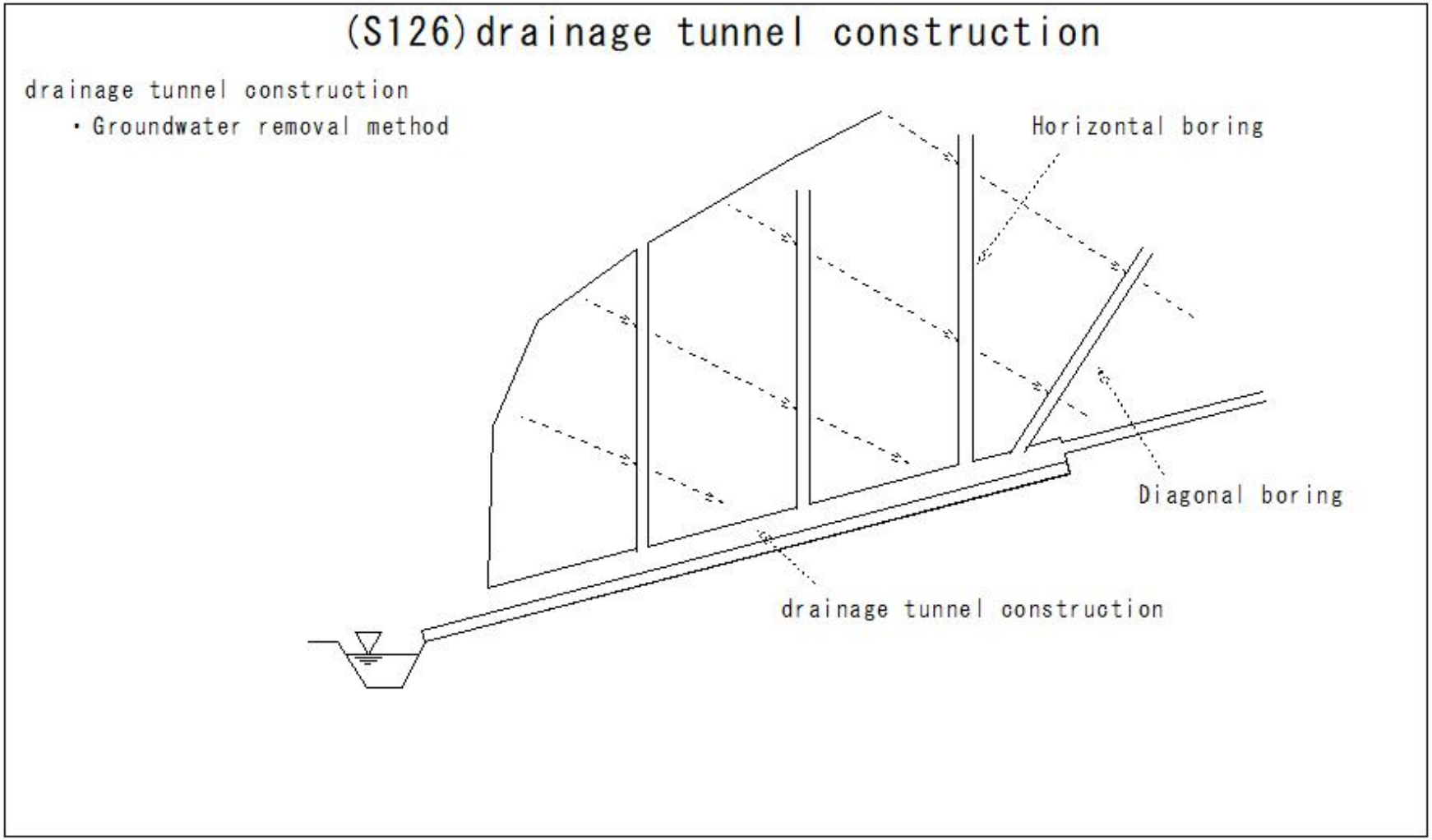
・Prevention of re-migration of streambed sediments

・Prevention of re-migration of streambed sediments



S55

(S126)drainage tunnel construction



(S127)check dam(erosion control dam)-sub dam

(S127)check dam(erosion control dam)-sub dam

check dam(erosion control dam)-sub dam

water cushion

main dam

L=(1.5-2.0)(H1 +ho)

H2=H/3-H/4

H1: Main dam height from the top of the water tap

ho: Water depth overflow from this dam

H: Height of dam

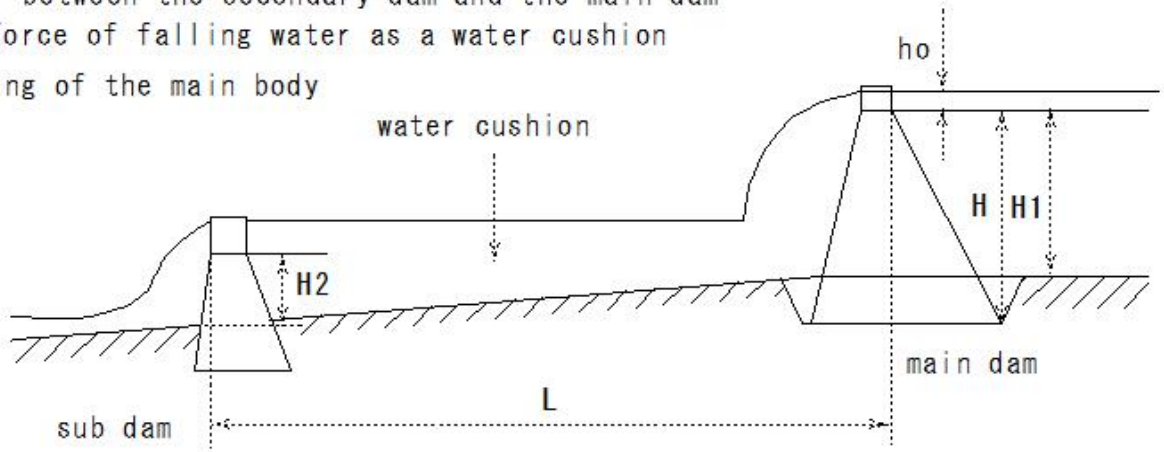
sub dam

Prevention of scouring downstream of this dam

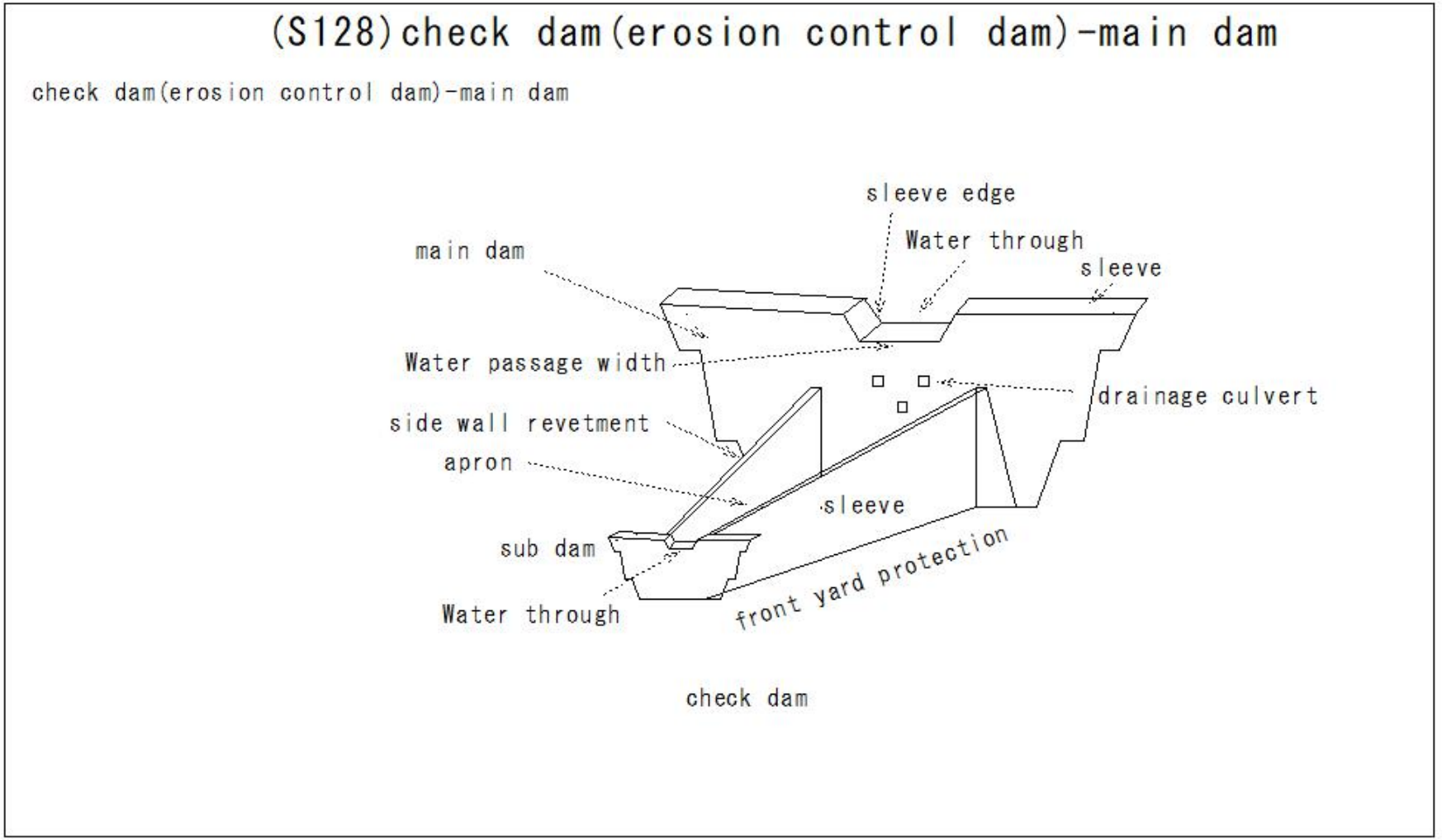
・Deposition of gravel between the secondary dam and the main dam

・Reduces the impact force of falling water as a water cushion

・Prevention of scouring of the main body



(S128)check dam(erosion control dam)-main dam



(S129)check dam(erosion control dam)-main dam

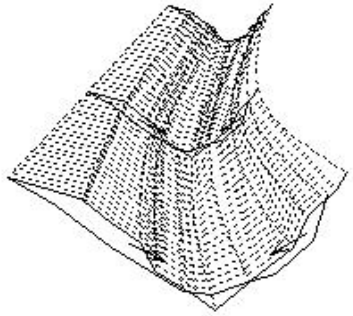
(S129)check dam(erosion control dam)-main dam

check dam(erosion control dam)

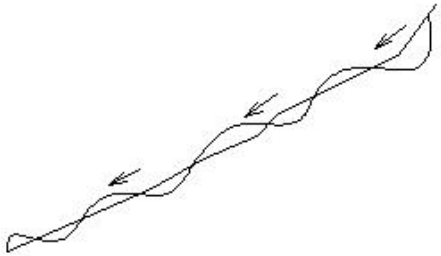
purpose

①Reducing mountain stream slope

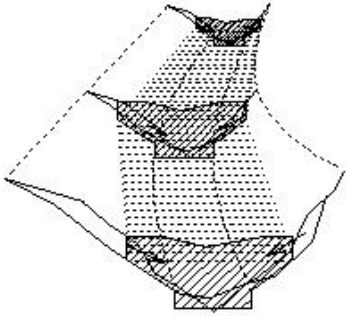
Vertical and horizontal erosion prevention



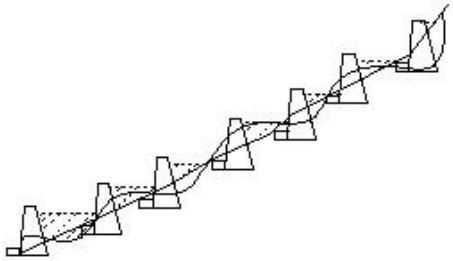
horizontal erosion



Vertical erosion

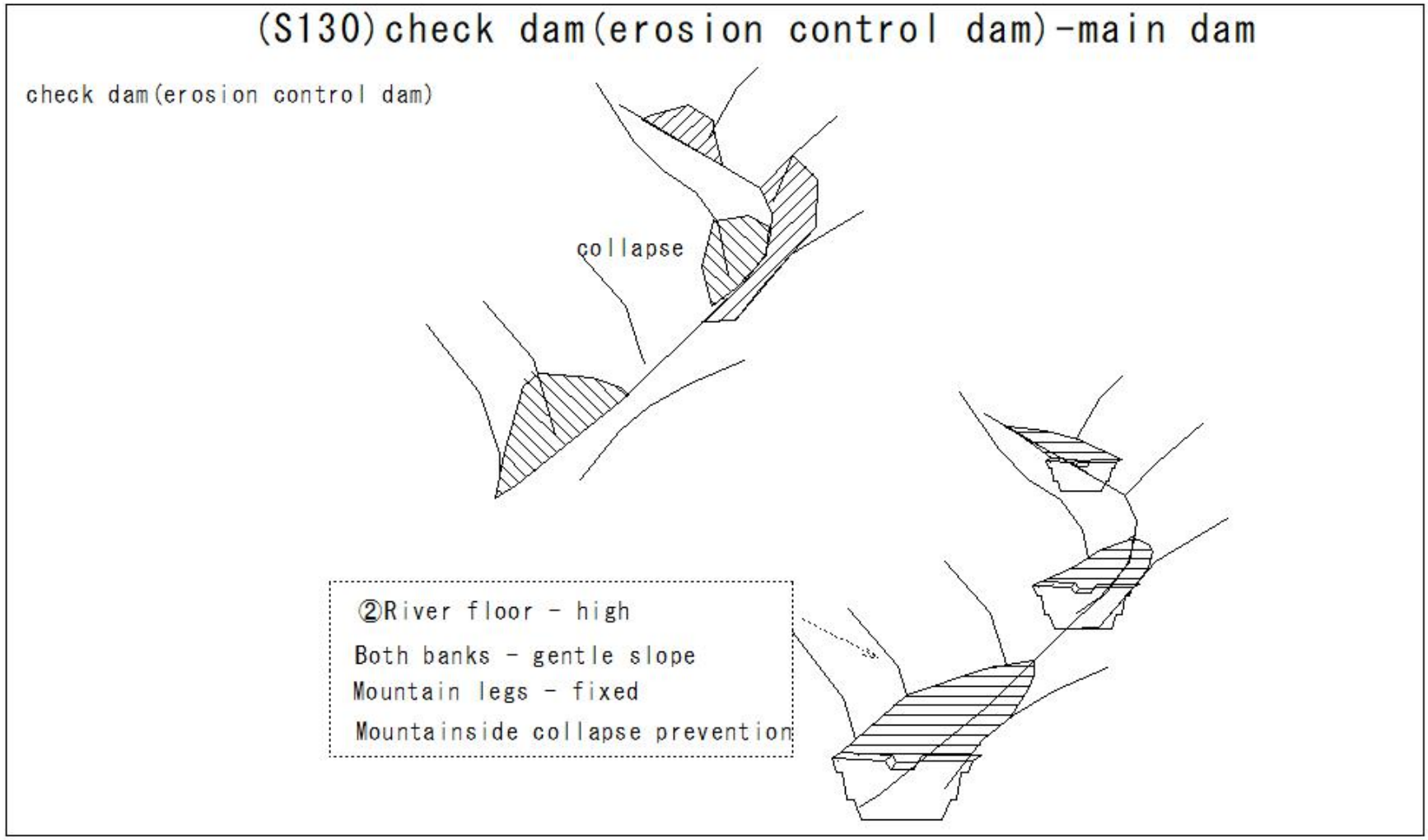


erosion prevention

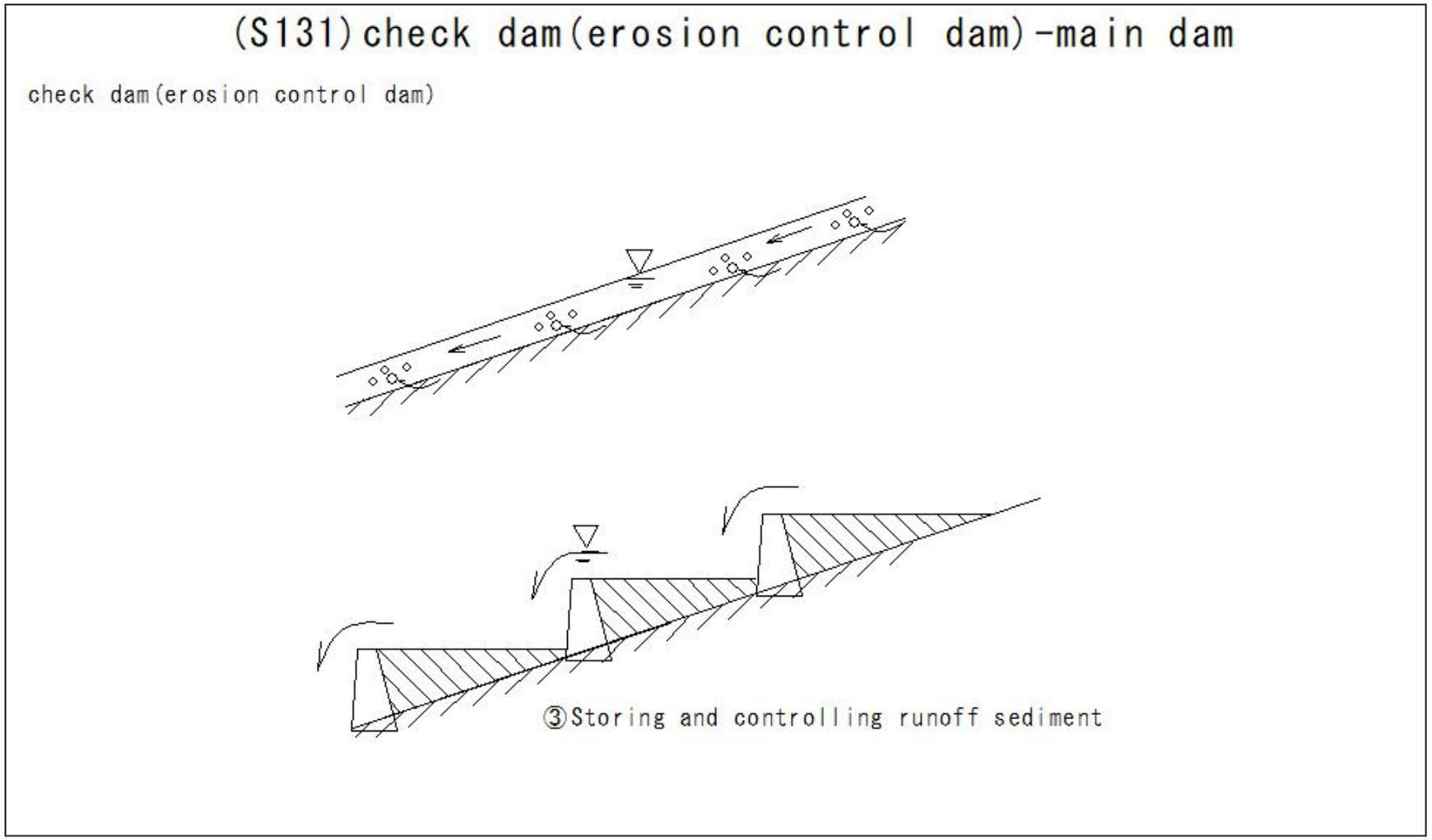


erosion prevention

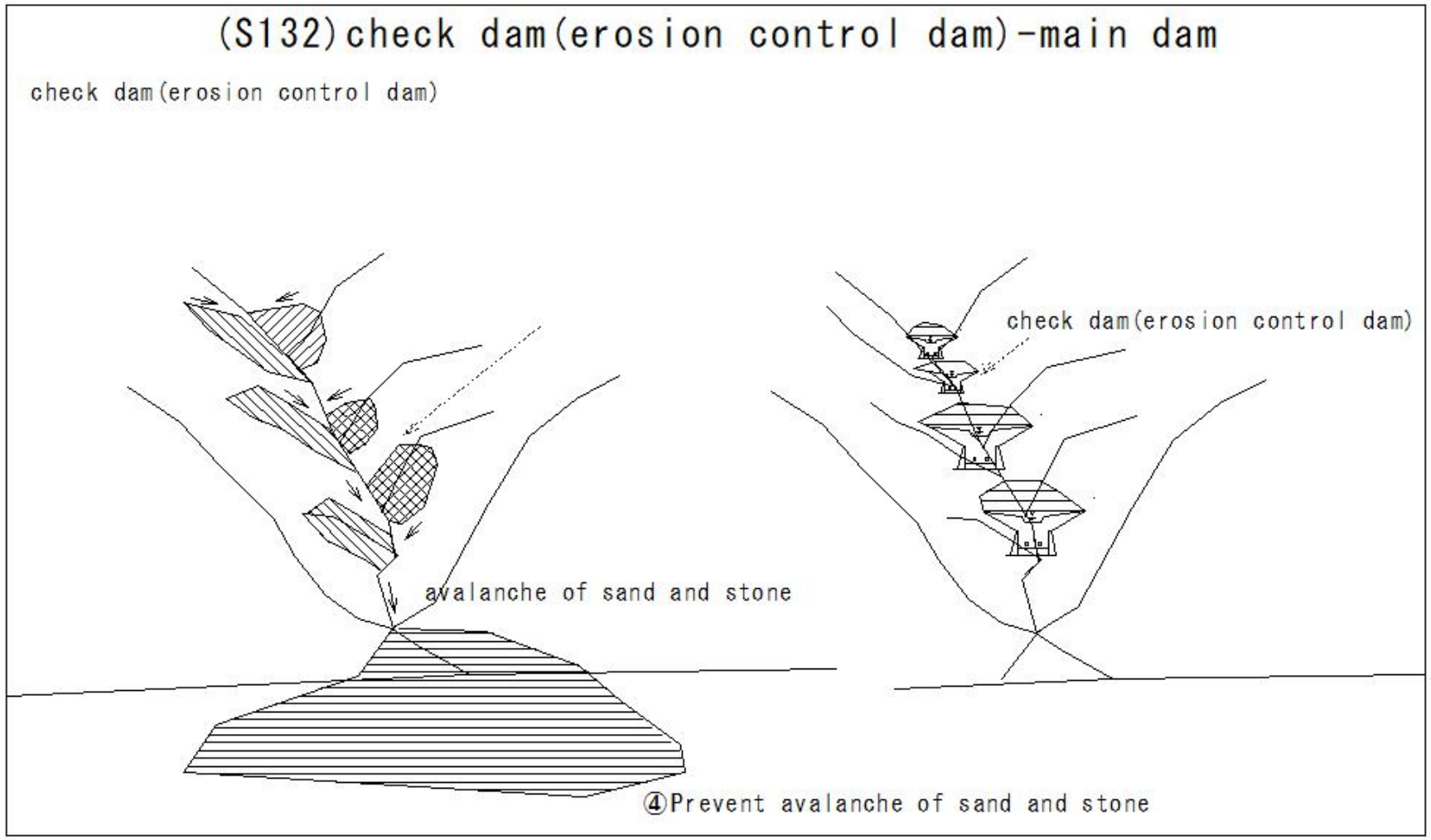
(S130)check dam(erosion control dam)-main dam



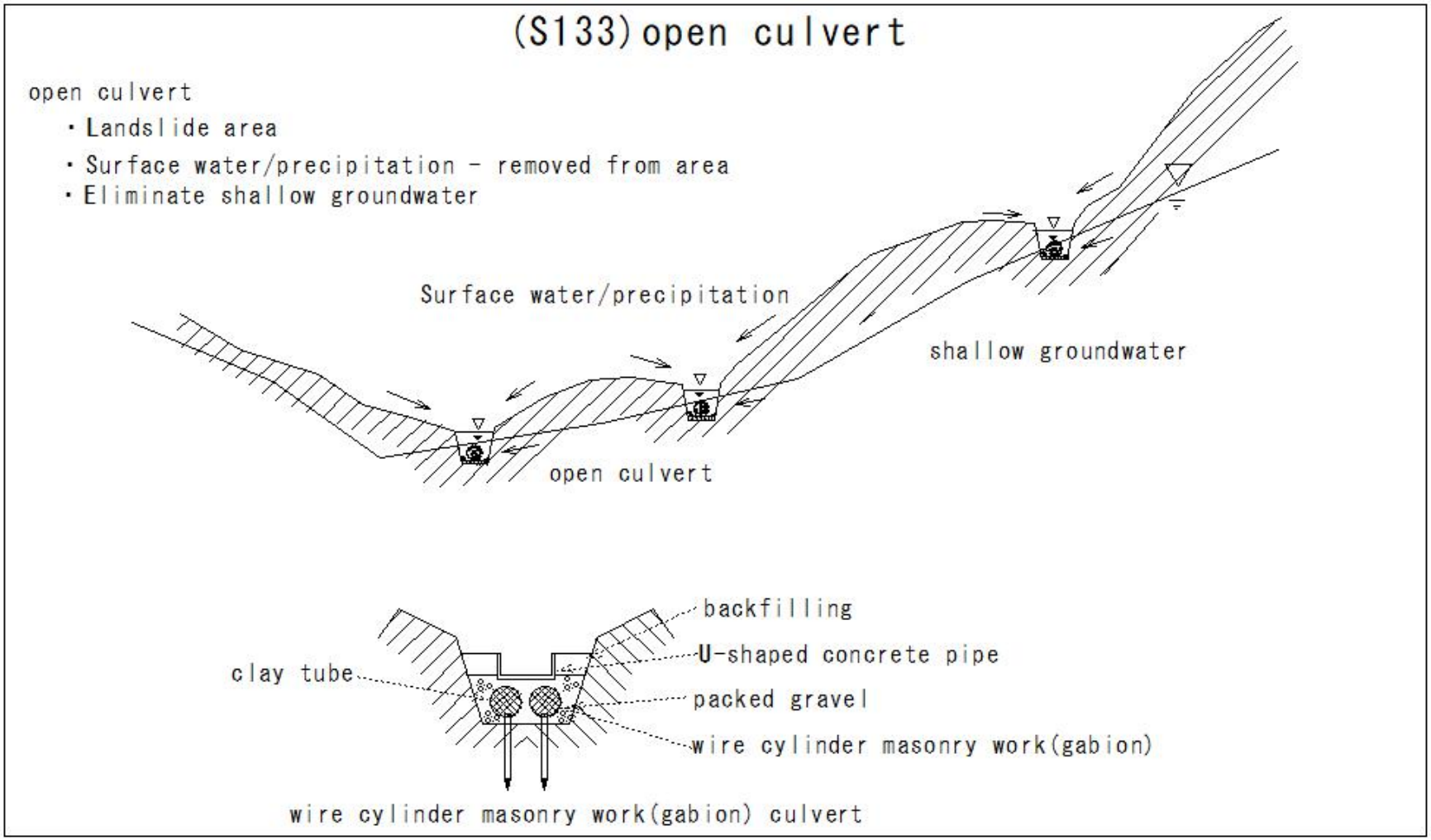
(S131)check dam(erosion control dam)-main dam



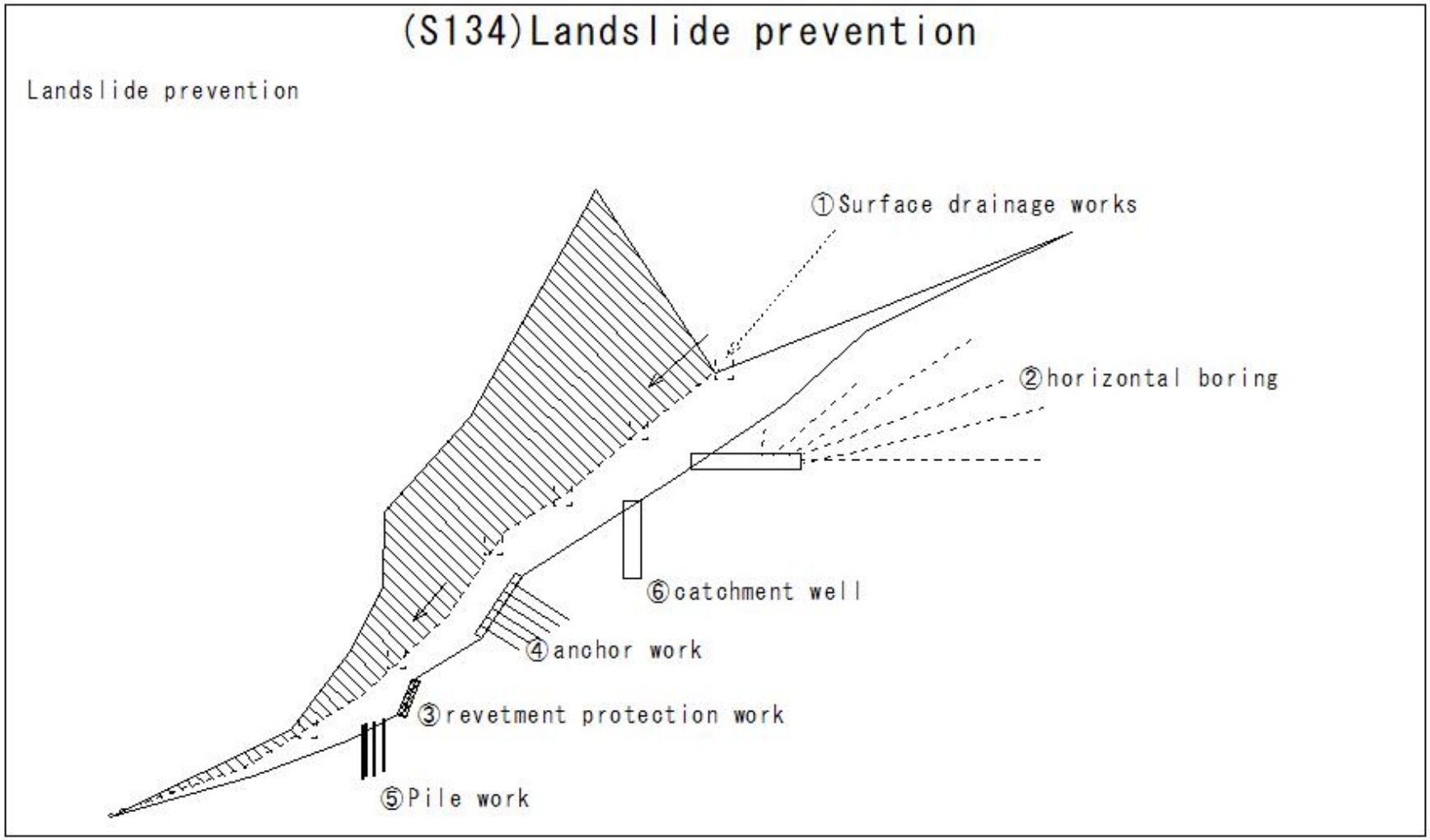
(S132)check dam(erosion control dam)-main dam



(S133)open culvert



(S134)Landslide prevention



(S135)Landslide prevention(horizontal boring)

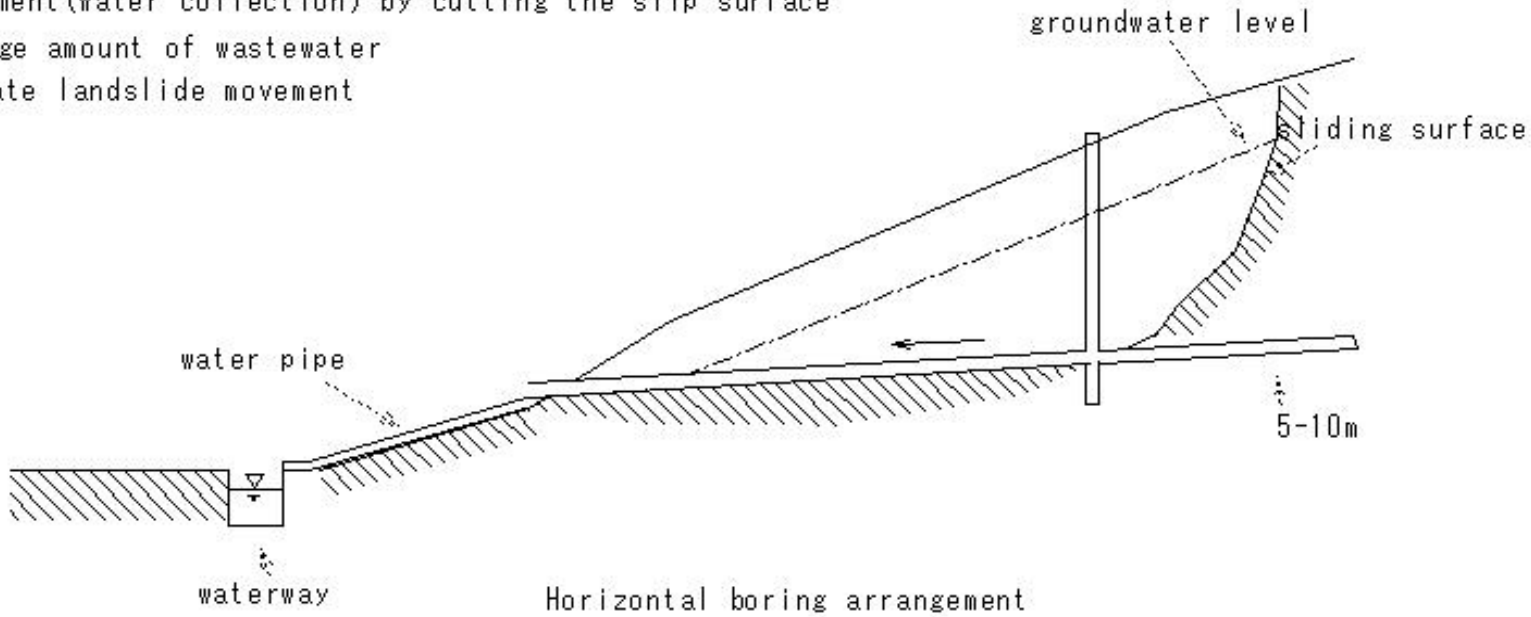
(S135)Landslide prevention(horizontal boring)

horizontal boring

- Shallow groundwater 3 m or more below the ground surface

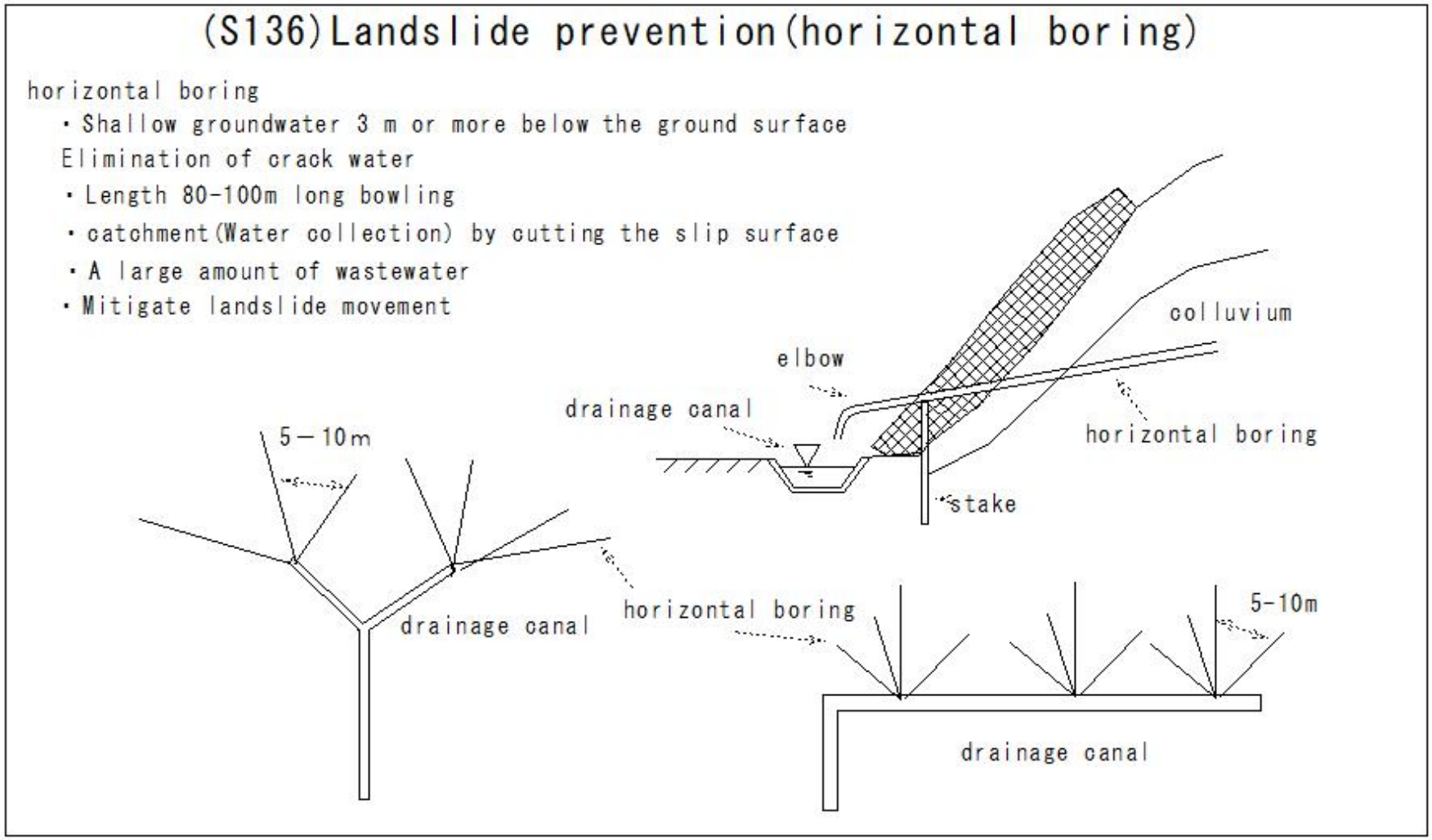
Elimination of crack water

- Length 80-100m long bowling
- catchment(Water collection) by cutting the slip surface
- A large amount of wastewater
- Mitigate landslide movement

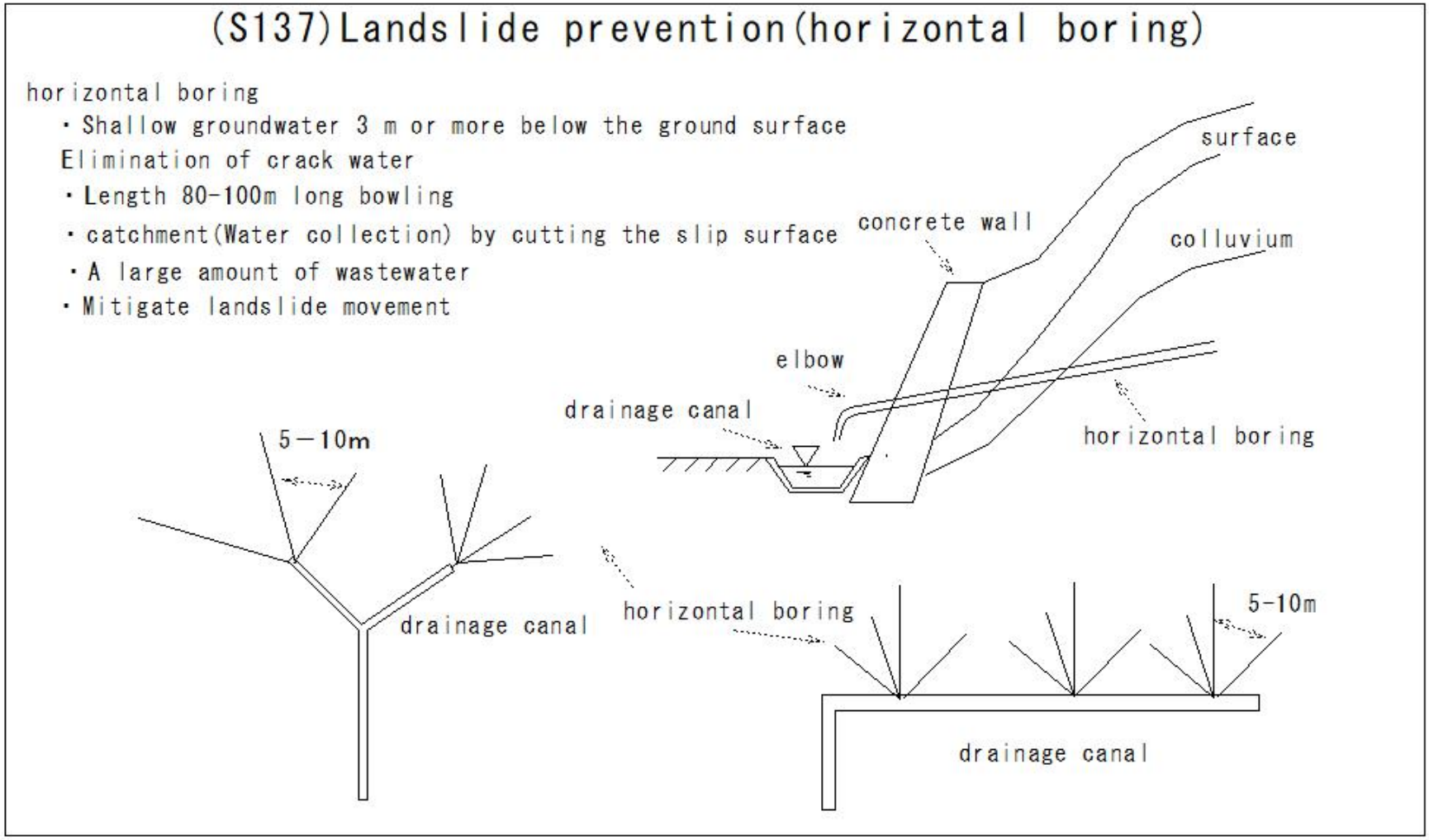


Horizontal boring arrangement

(S136)Landslide prevention(horizontal boring)



(S137)Landslide prevention(horizontal boring)



(S138)Landslide prevention(horizontal boring)

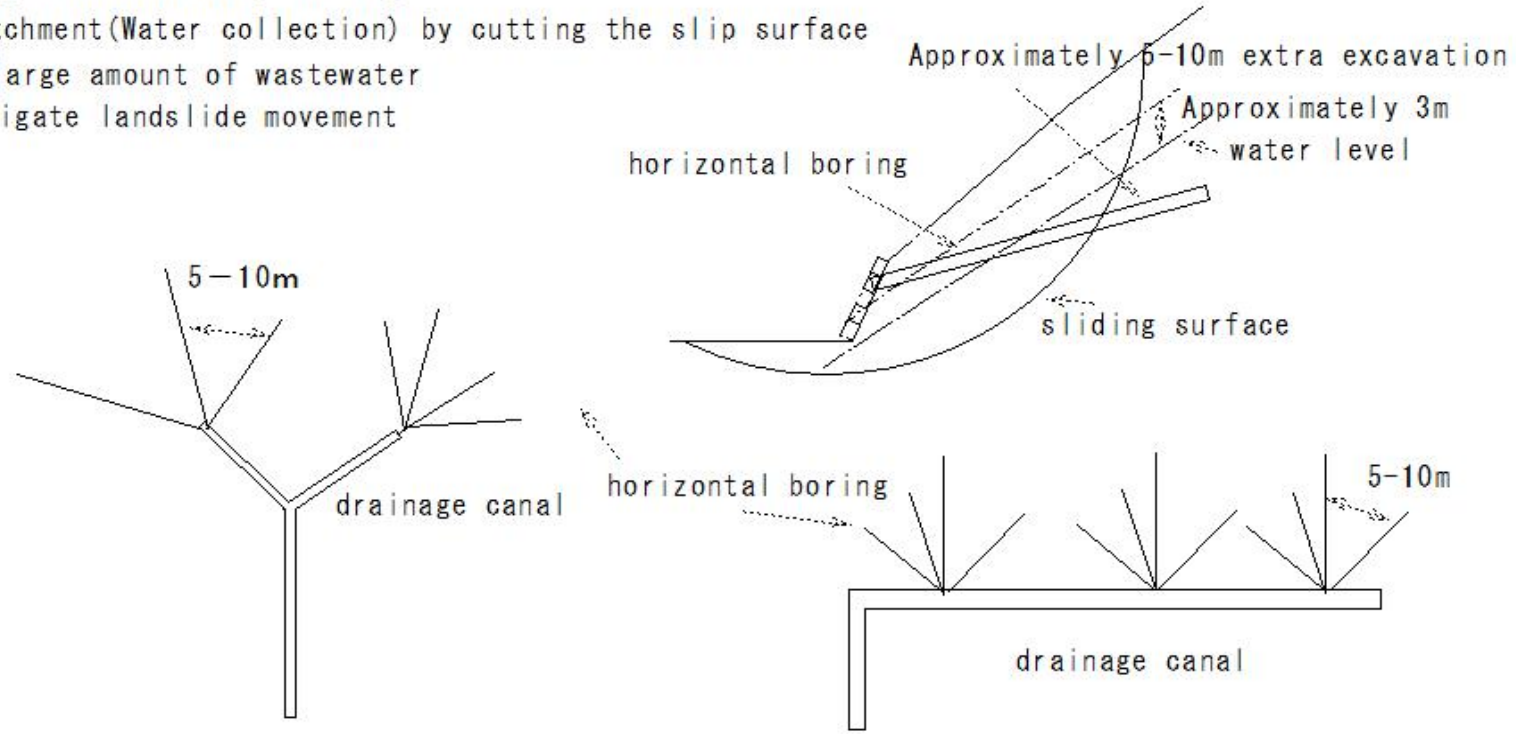
(S138)Landslide prevention(horizontal boring)

horizontal boring

- Shallow groundwater 3 m or more below the ground surface

Elimination of crack water

- Length 80-100m long bowling
- catchment(Water collection) by cutting the slip surface
- A large amount of wastewater
- Mitigate landslide movement

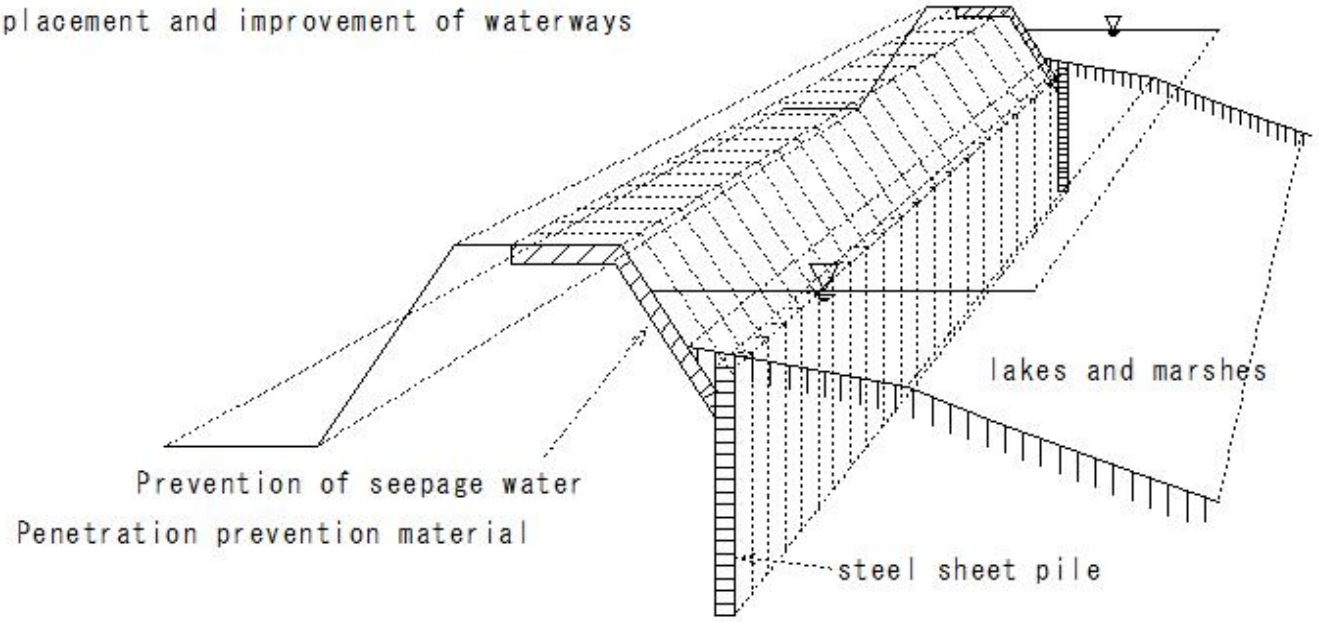


(S139)water leak

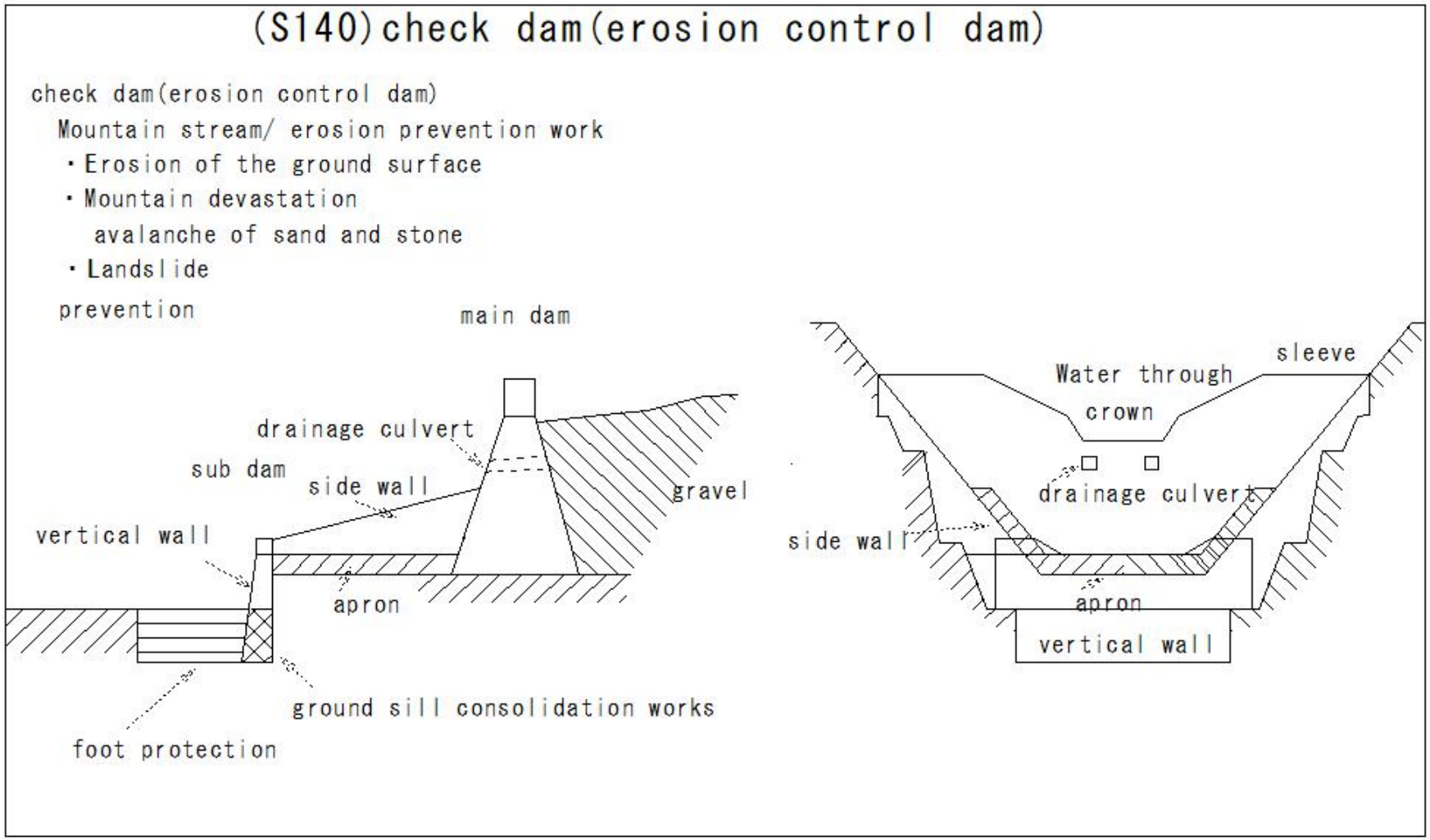
(S139)water leak

water leak

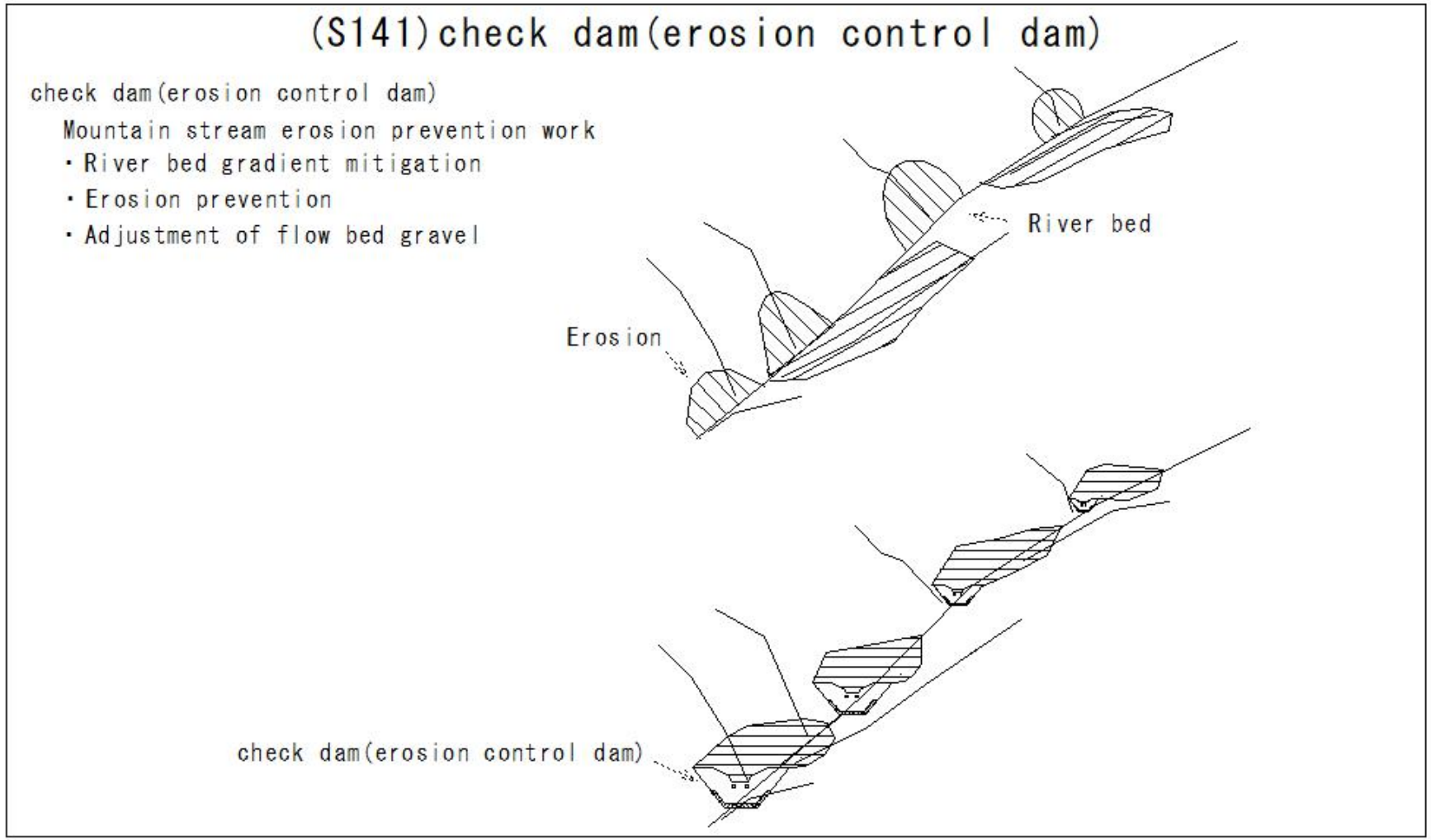
- Water flows out from cracks in lakes and waterways.
- Water leakage - Seepage water - Landslide induction
- Permeation prevention work
- Coating with water-impermeable material
- Swamp excavation
- Replacement and improvement of waterways



(S140)check dam(erosion control dam)



(S141)check dam(erosion control dam)



(S142)check dam(erosion control dam)

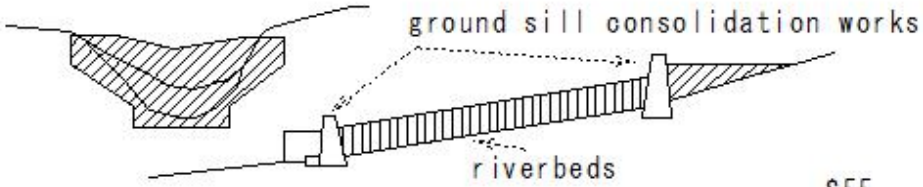
(S142)check dam(erosion control dam)

check dam(erosion control dam)

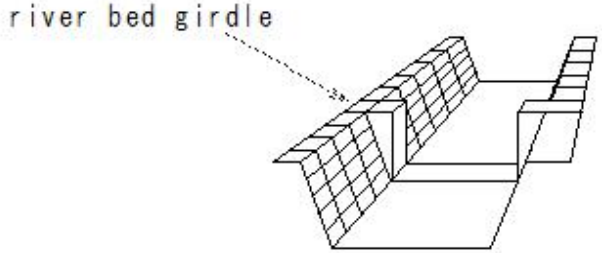
- Stabilization of riverbeds and high water beds
- Cross direction of river

ground sill consolidation works

river bed girdle: Same height as river bed



S55



S102

(S143)torrent control works

(S143)torrent control works

torrent control works

torrent control works

①Preventing sand and gravel from flowing out

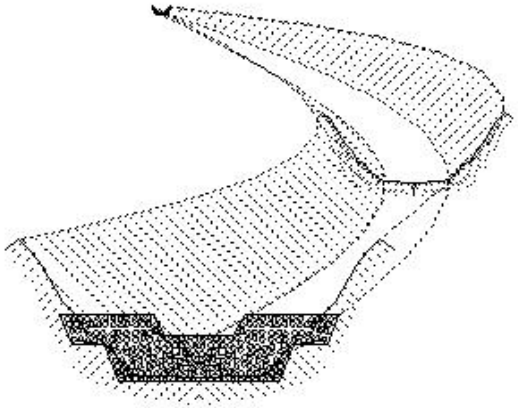
・Preventing erosion of mountain streams and banks

②torrent control works

Bank protection work(revetment)

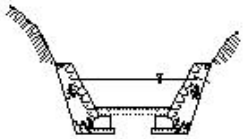
groin

watercourse



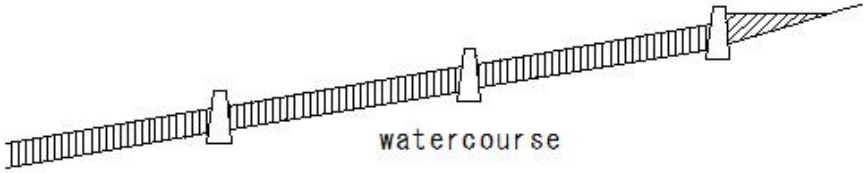
check dam(erosion control dam)

S25



(revetment)bank protection

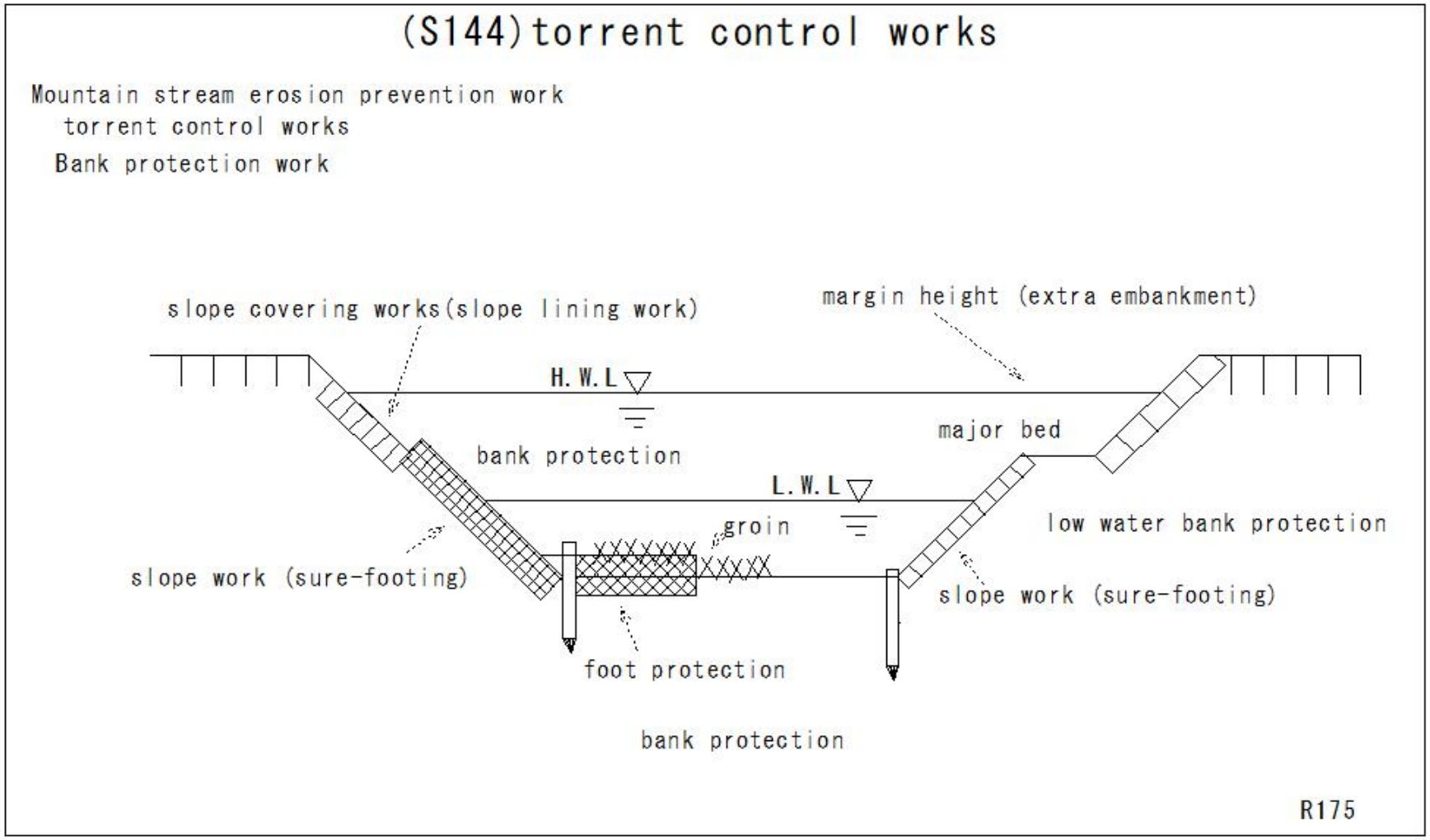
S66



watercourse

S69

(S144)torrent control works



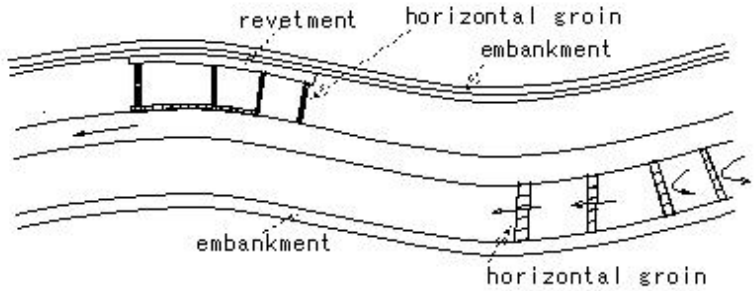
(S145)torrent control works

(S145)torrent control works

Mountain stream erosion prevention work

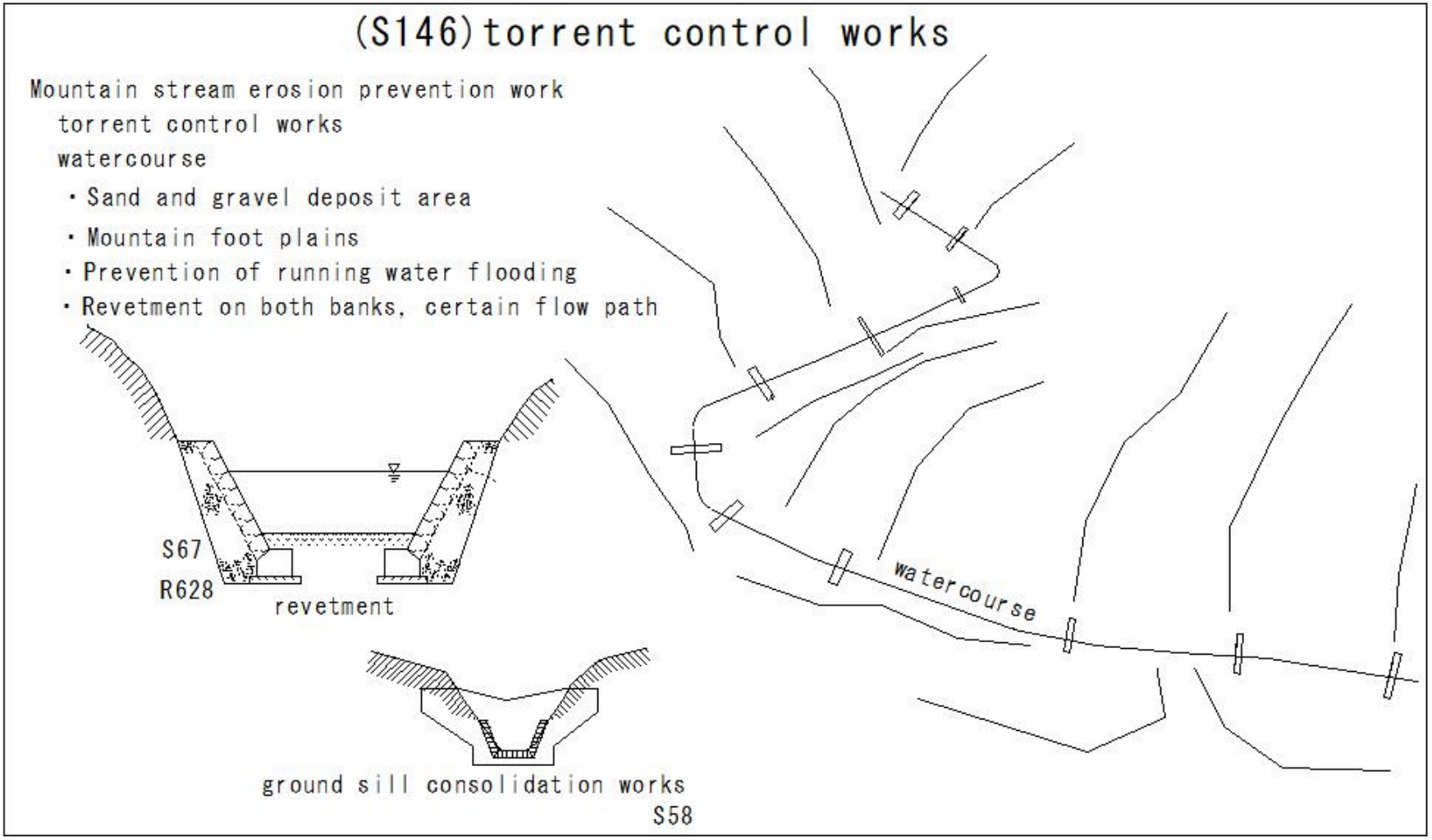
torrent control works

groin



R178 R179

(S146)torrent control works



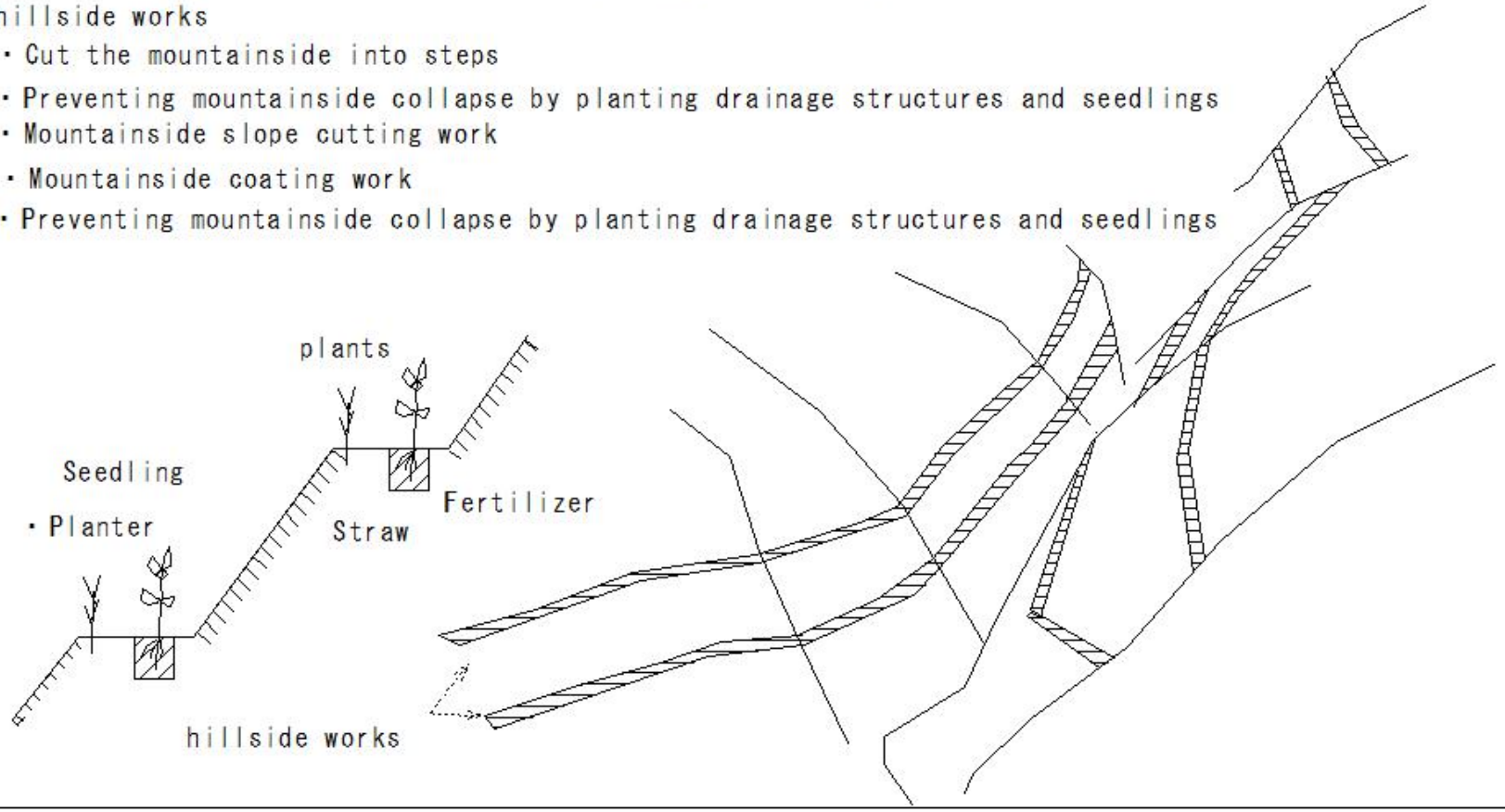
(S147)hillside works

(S147)hillside works

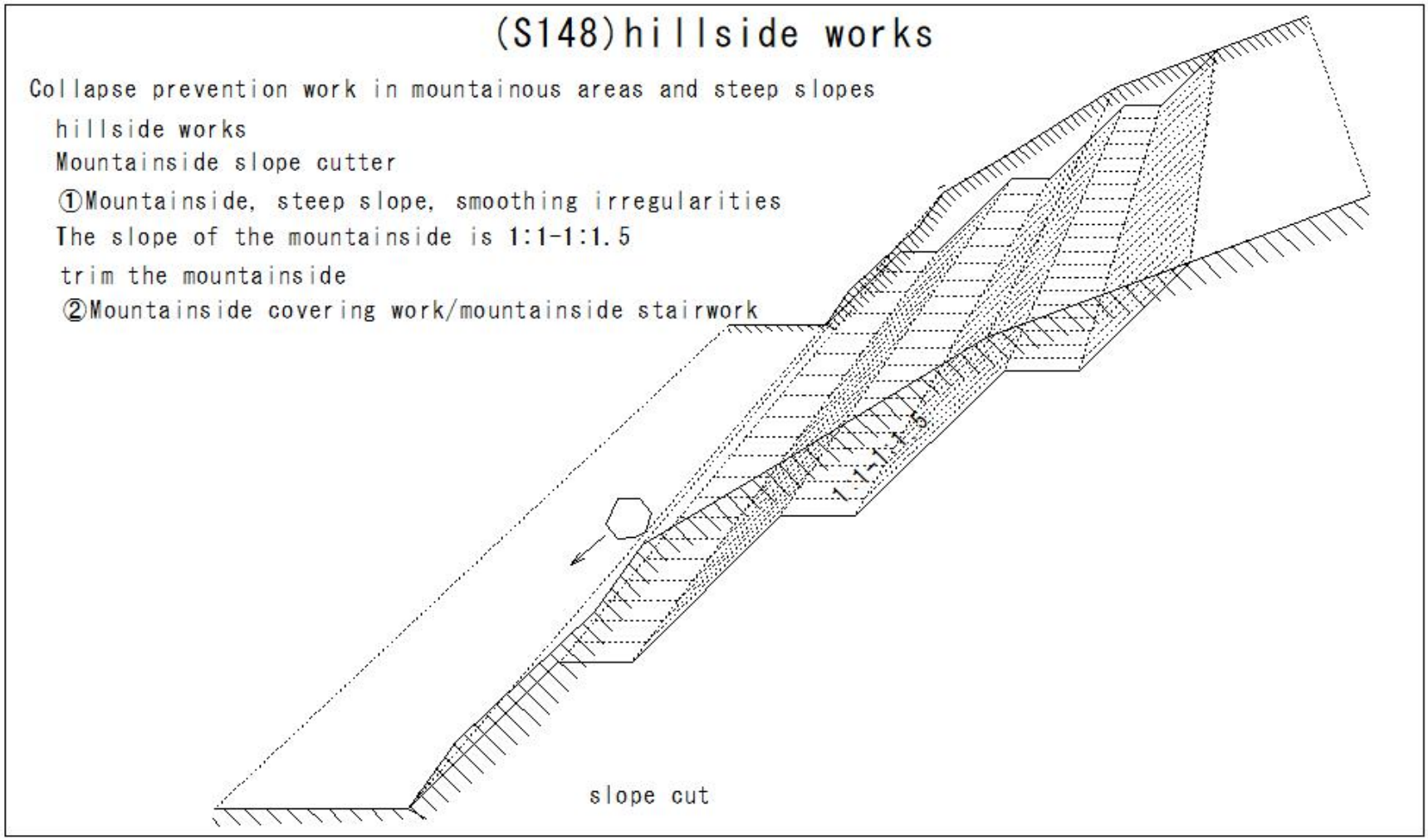
Collapse prevention work in mountainous areas and steep slopes

hillside works

- Cut the mountainside into steps
- Preventing mountainside collapse by planting drainage structures and seedlings
- Mountainside slope cutting work
- Mountainside coating work
- Preventing mountainside collapse by planting drainage structures and seedlings



(S148)hillside works-Mountainside slope cutter



(S149)hillside works-Coating work

(S149)hillside works-Coating work

Collapse prevention work in mountainous areas and steep slopes

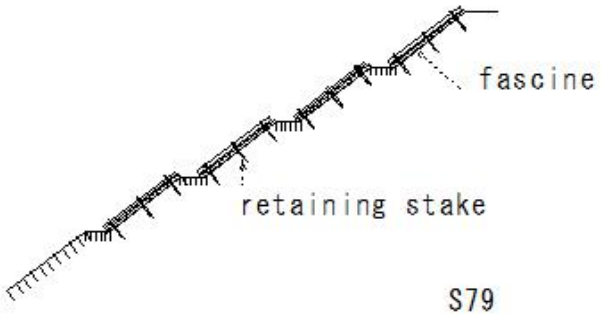
Mountainside coating work

①Erosion by surface water

Coating and protecting mountainside slopes from frost and melting snow

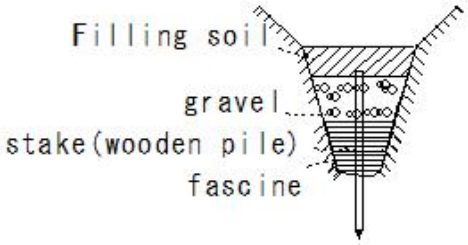
②fascine laying work fascine bundle work

③Valley area: Valley stop works and drainage works installed



S79

fascine work



S99

fascine-filled culvert

(S150)hillside works-mountainside stairwork

(S150)hillside works-mountainside stairwork

hillside works-mountainside stairwork

Collapse prevention work in mountainous areas and steep slopes

mountainside stairwork

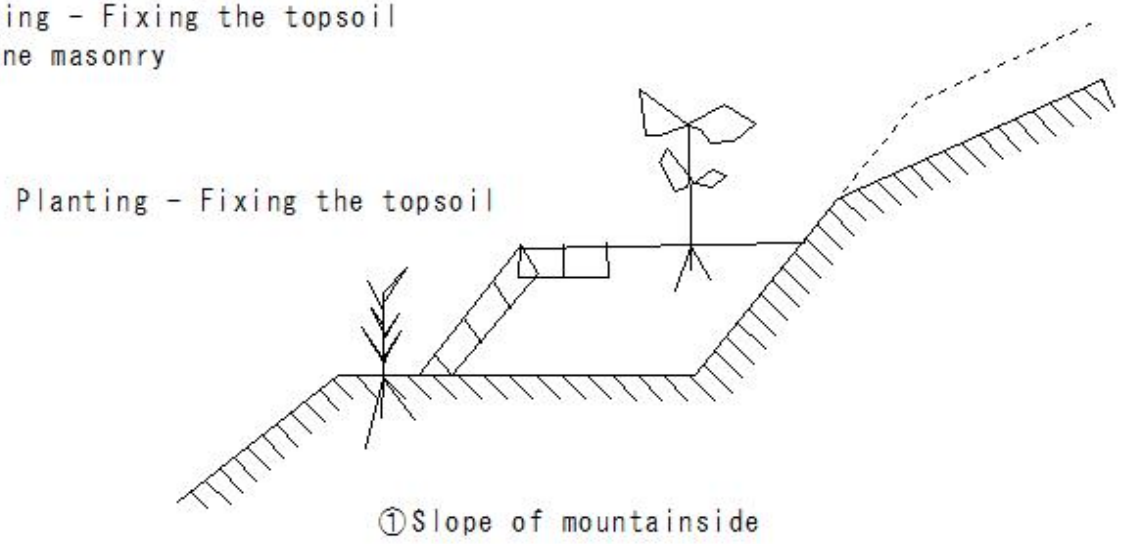
①Slope of mountainside

set up stairs

Stabilize the slope

Planting - Fixing the topsoil

②Stone masonry



(S151)hillside works-Landslide prevention work

(S151)hillside works-Landslide prevention work

Collapse prevention work in mountainous areas and steep slopes

Landslide prevention work

①Canal network - Drainage - Channel works

②Preventing the rise of groundwater level

Culverts, catchment(water collection) wells, horizontal borings, drainage tunnels

Groundwater drainage works

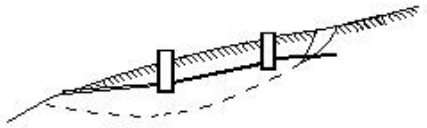
Canal network

S133

Drainage culvert

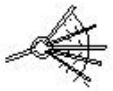
S101

catchment(water collection) wells

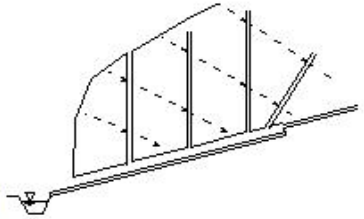


S119

horizontal borings

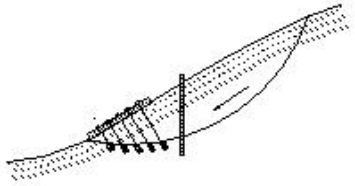


drainage tunnels



S119

Pile work



S126

S94

(S152)Landslide prevention work

(S152)Landslide prevention work

Collapse prevention work in mountainous areas and steep slopes

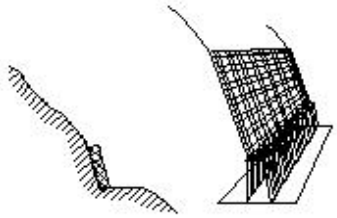
Landslide prevention work

①Retaining wall work

②frame(crib) work

③Concrete spraying work

Retaining wall

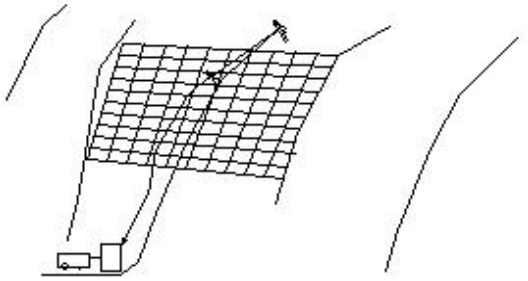


S96

Concrete frame work

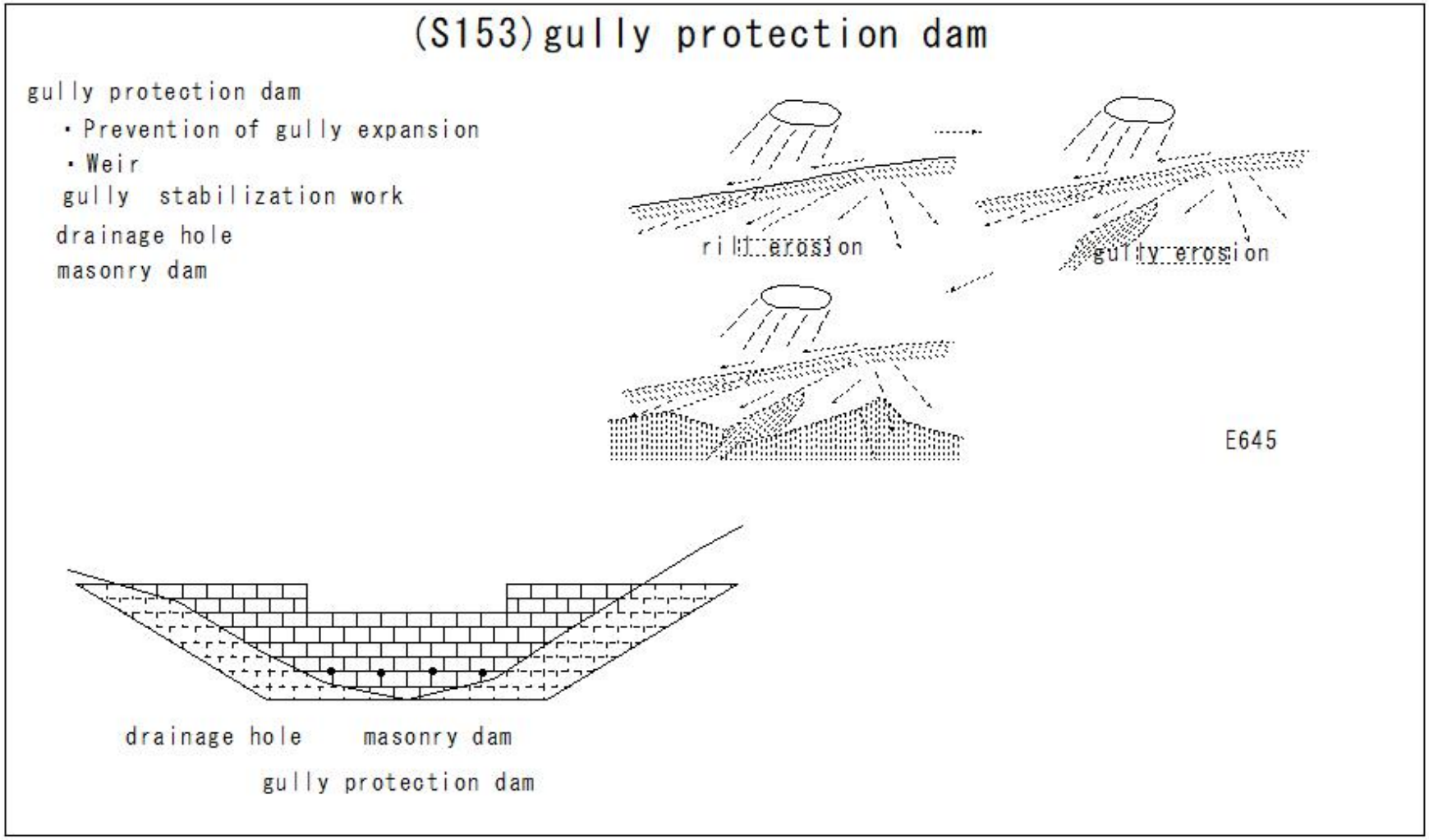
C926

Concrete spraying

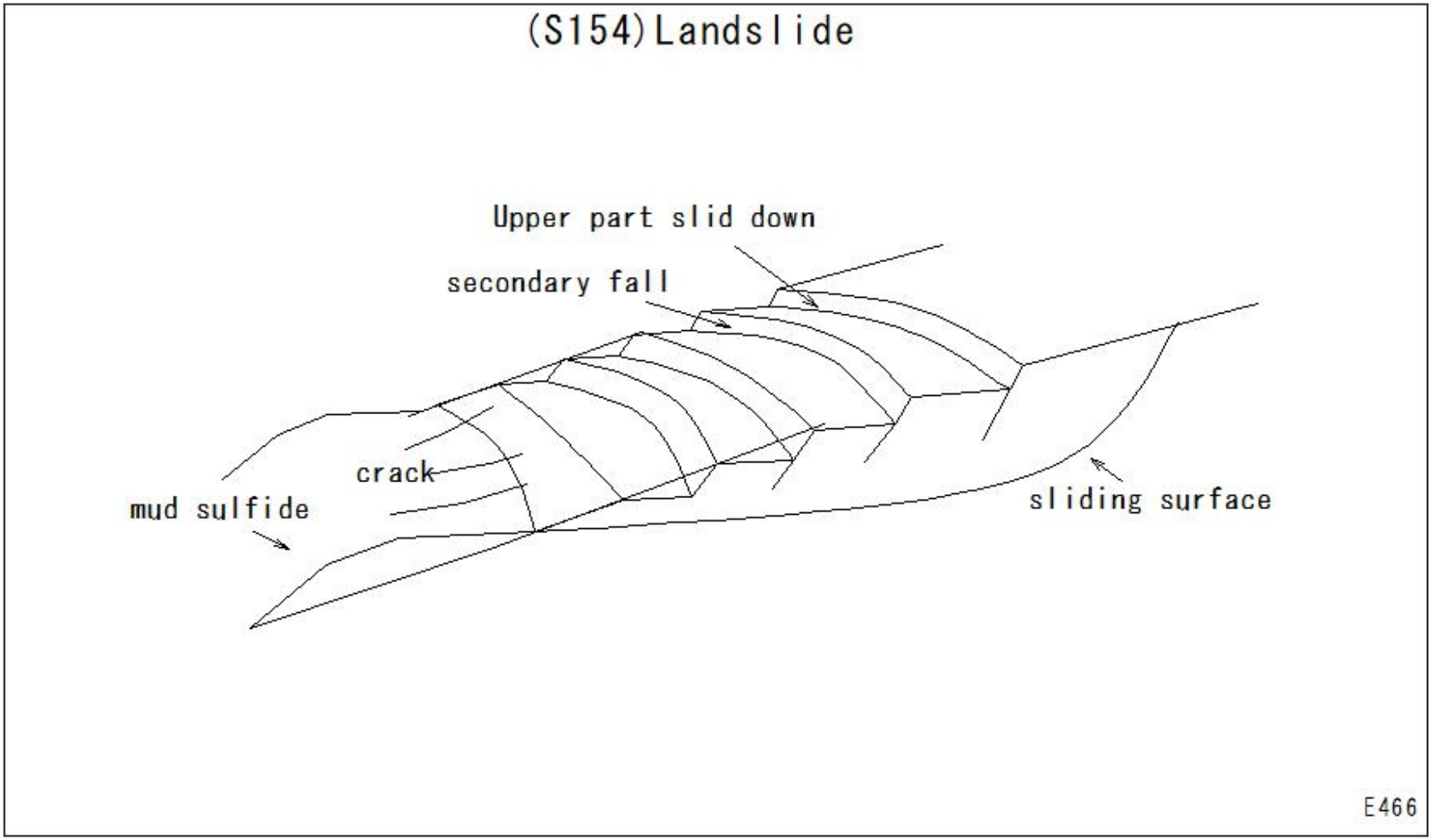


C1324

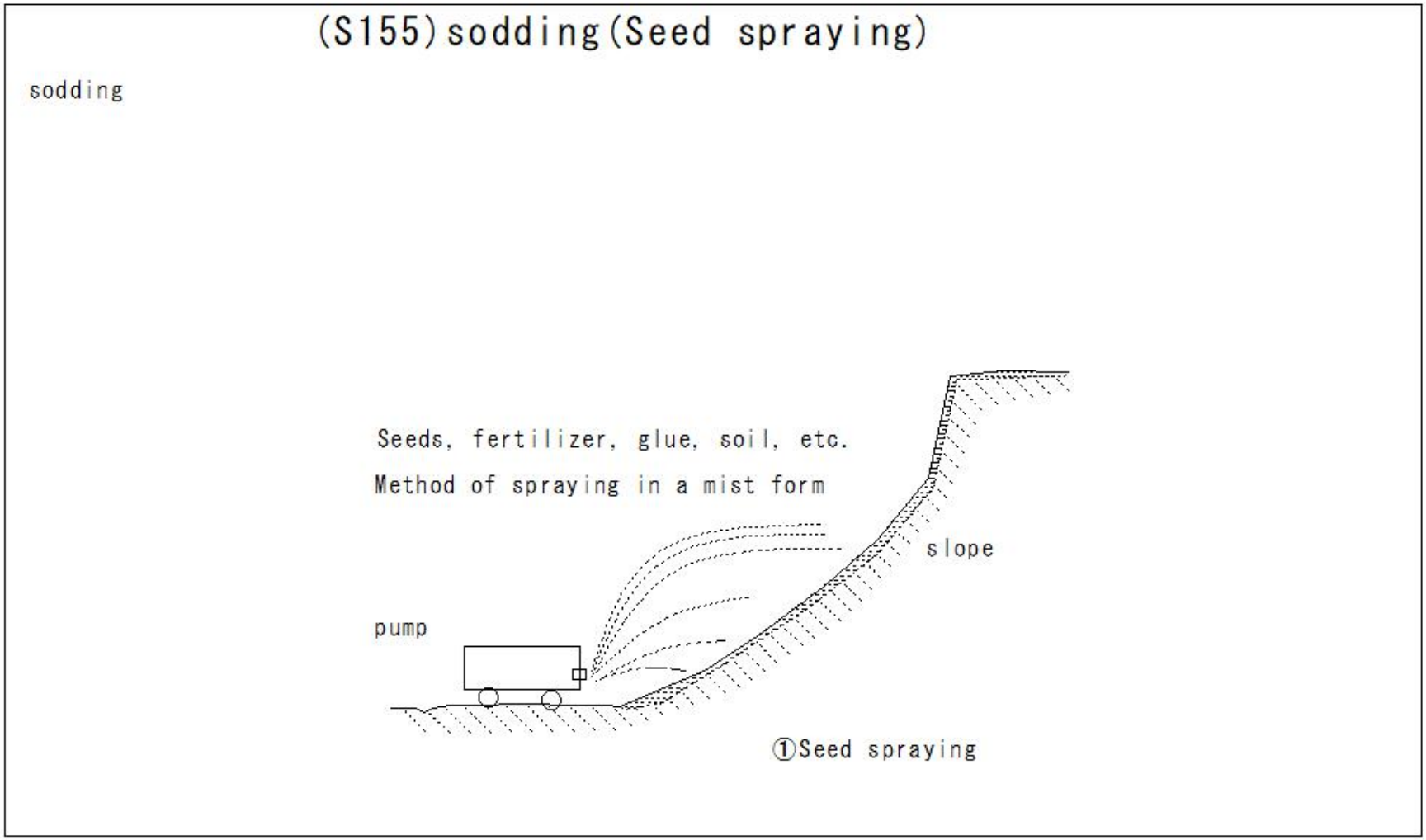
(S153)gully protection dam



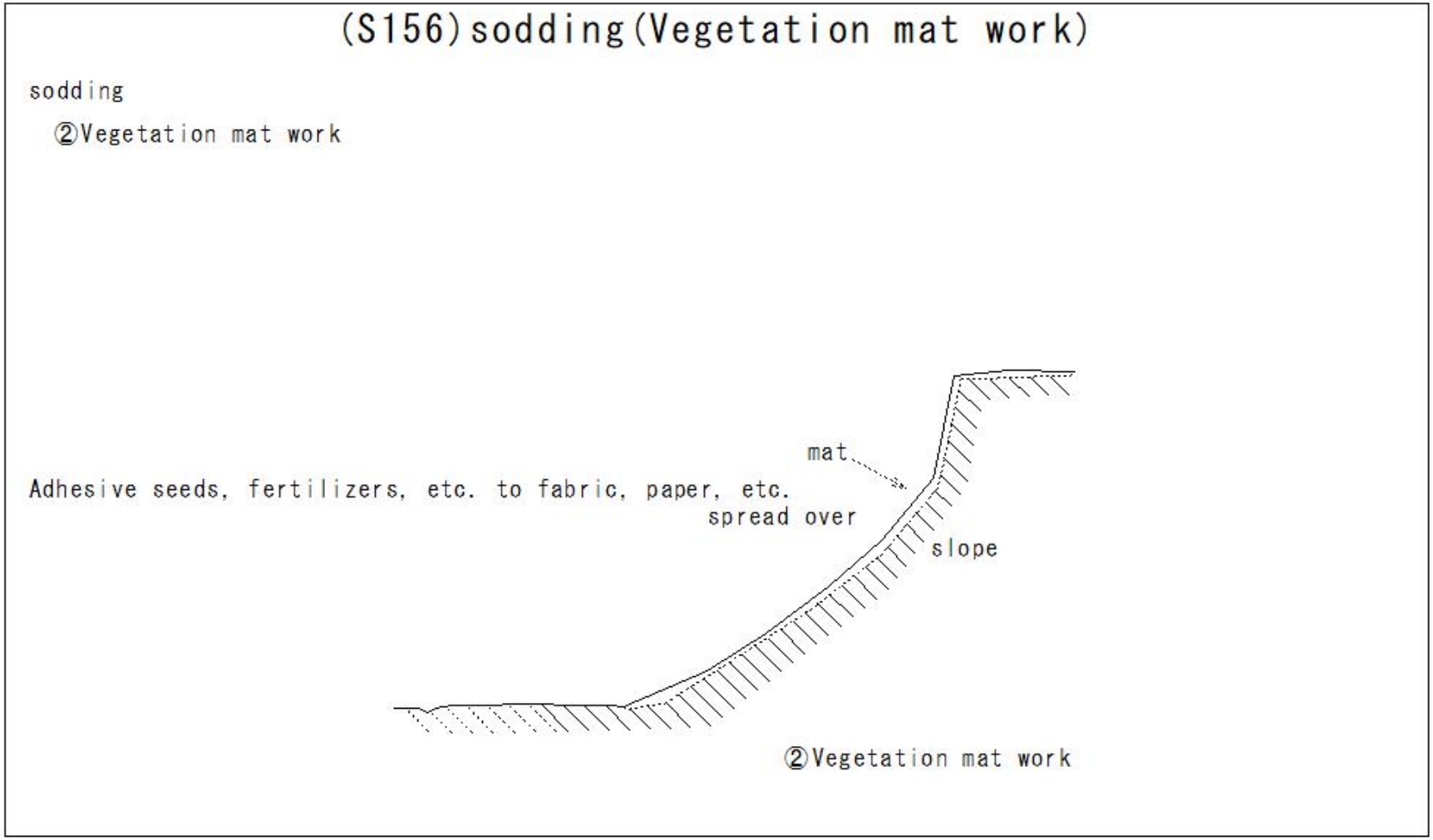
(S154)landslide



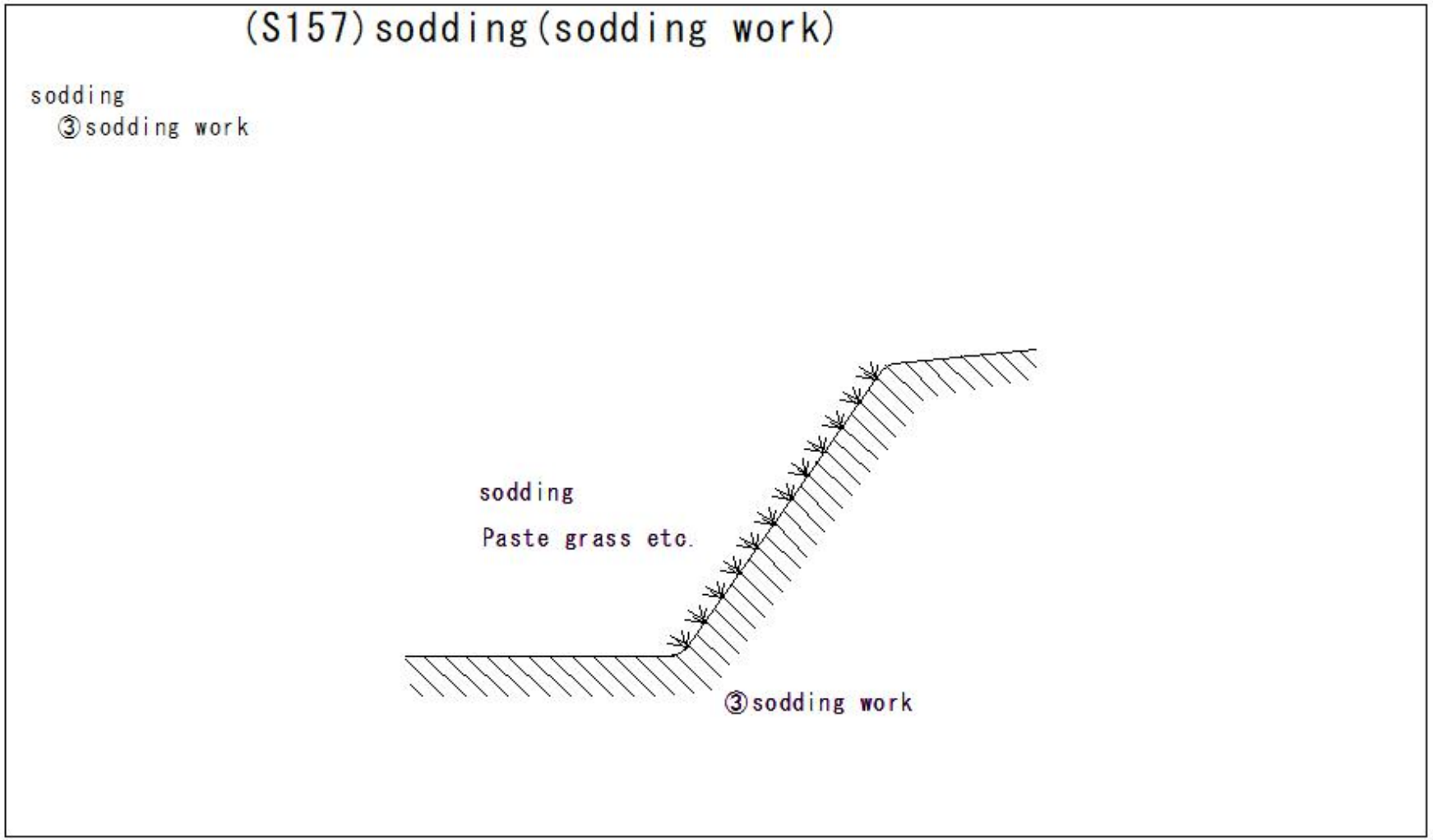
(S155)sodding(Seed spraying)



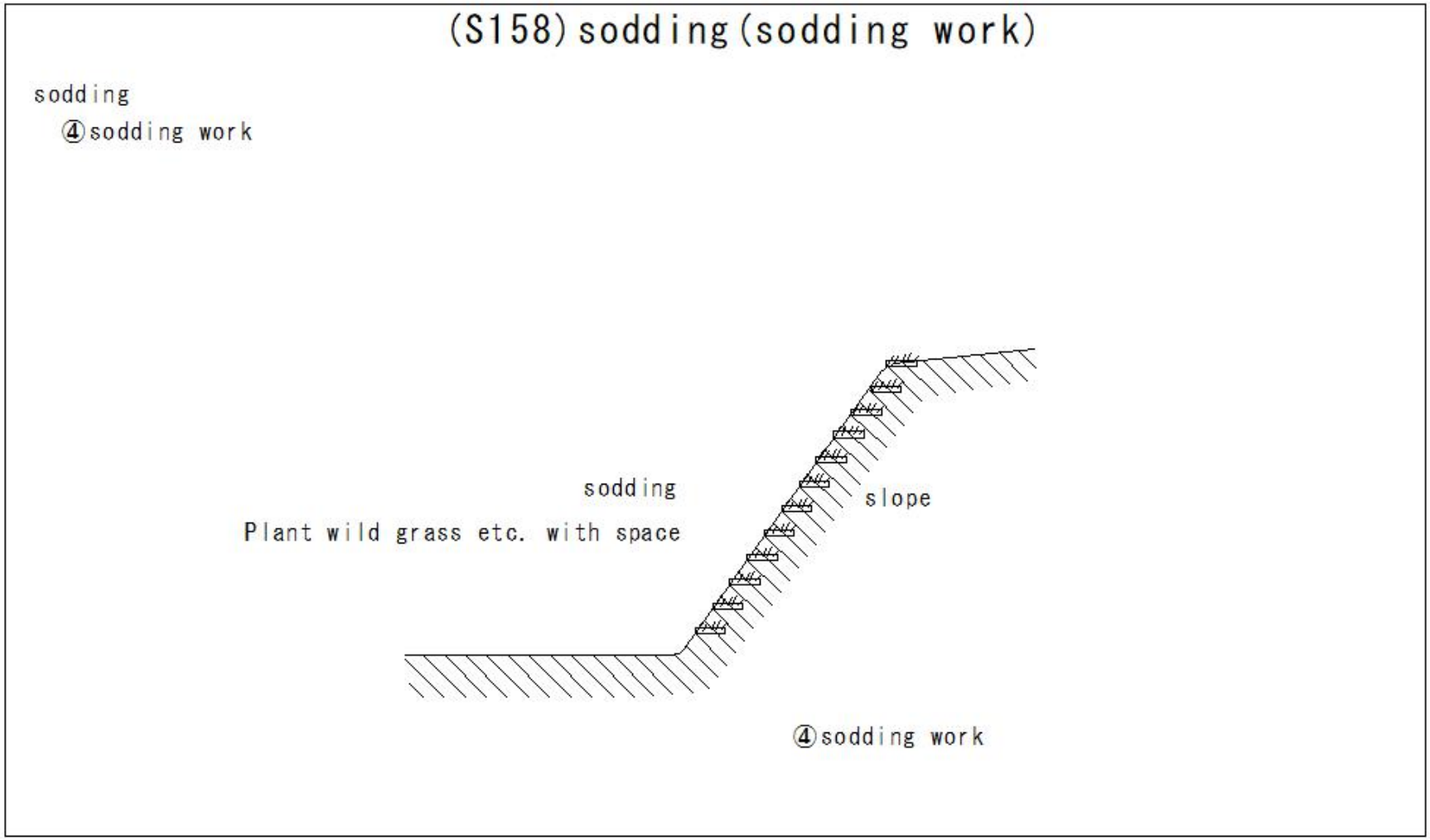
(S156)sodding(Vegetation mat work)



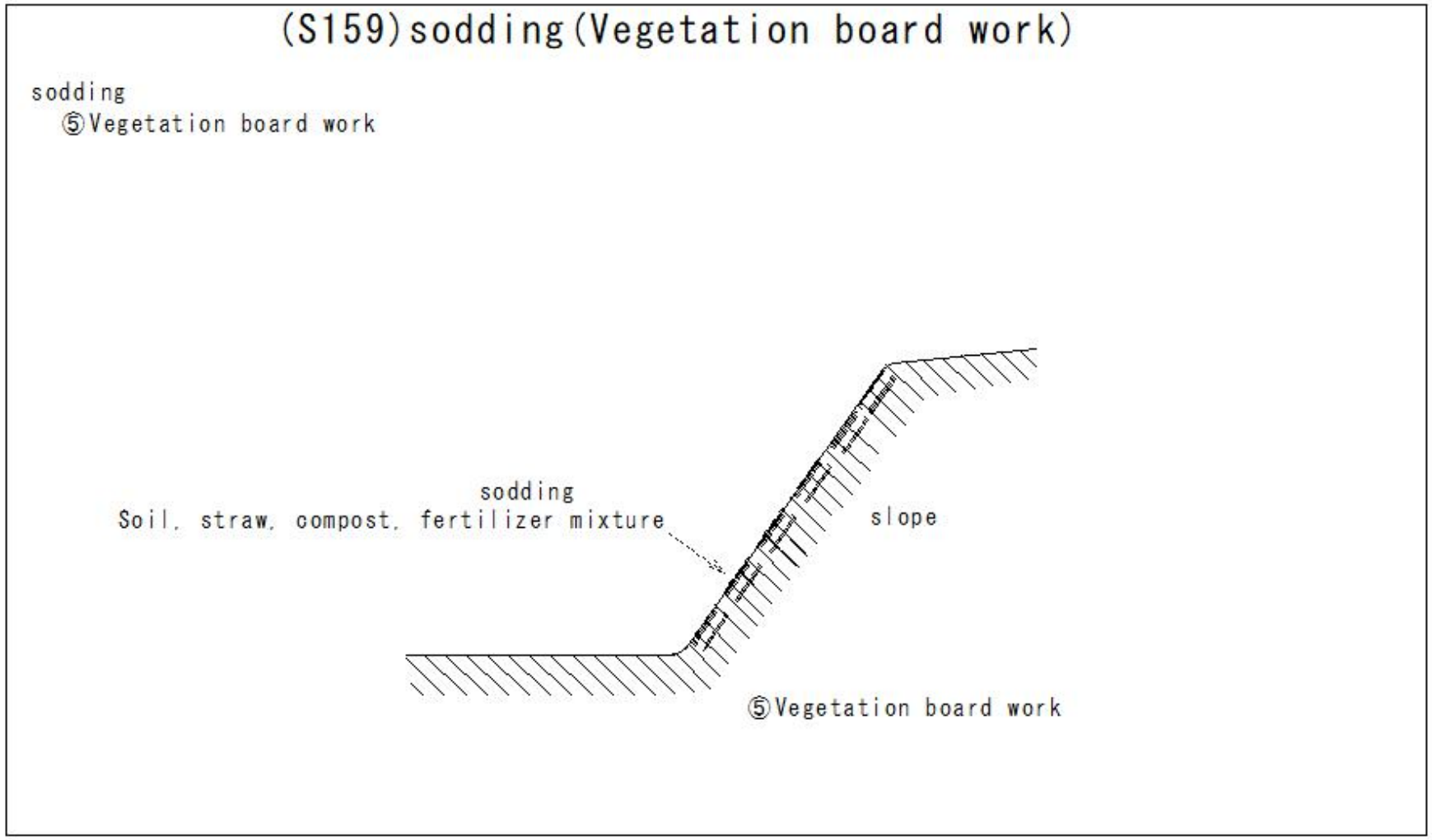
(S157)sodding(sodding work)



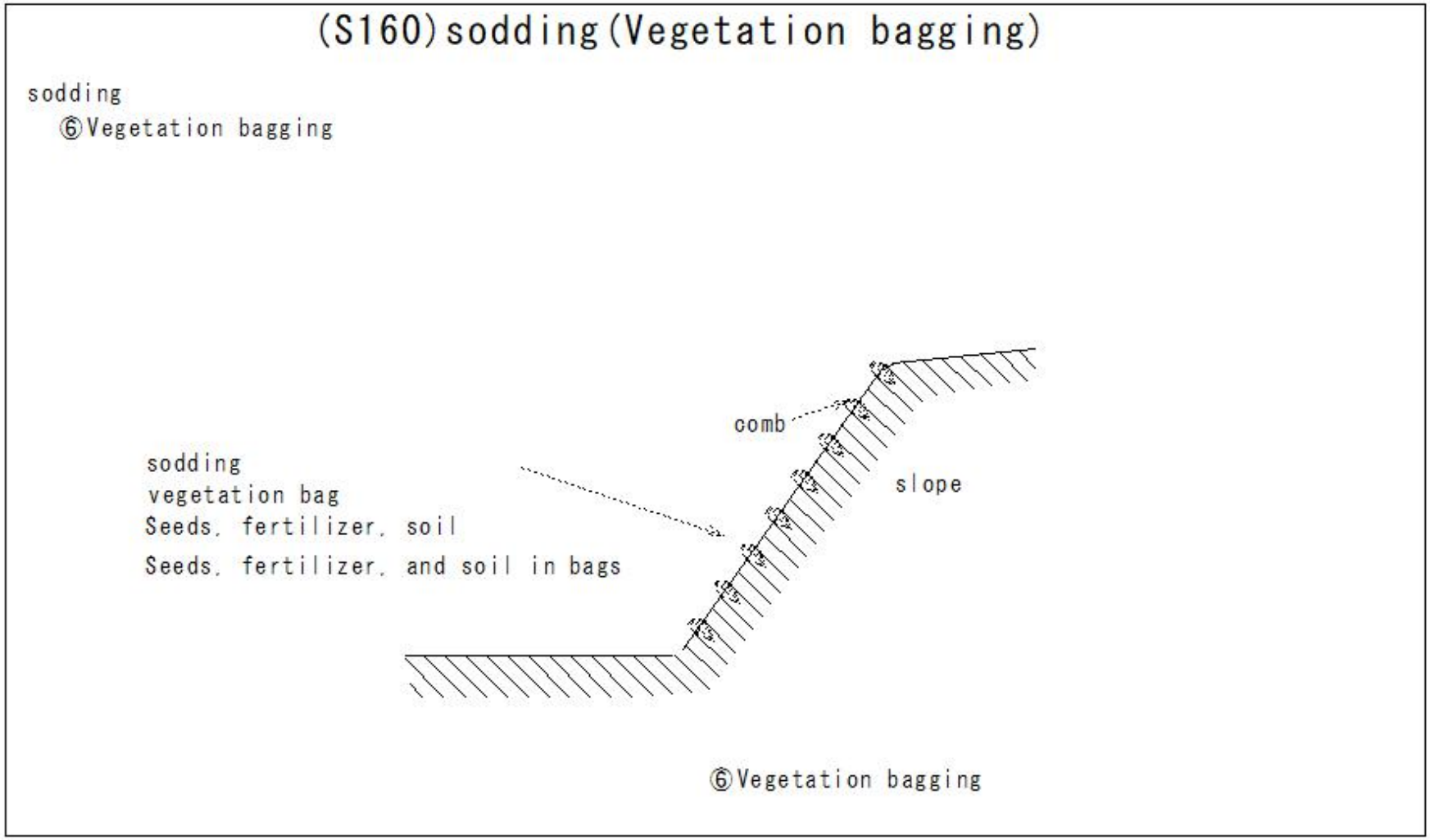
(S158)sodding(sodding work)



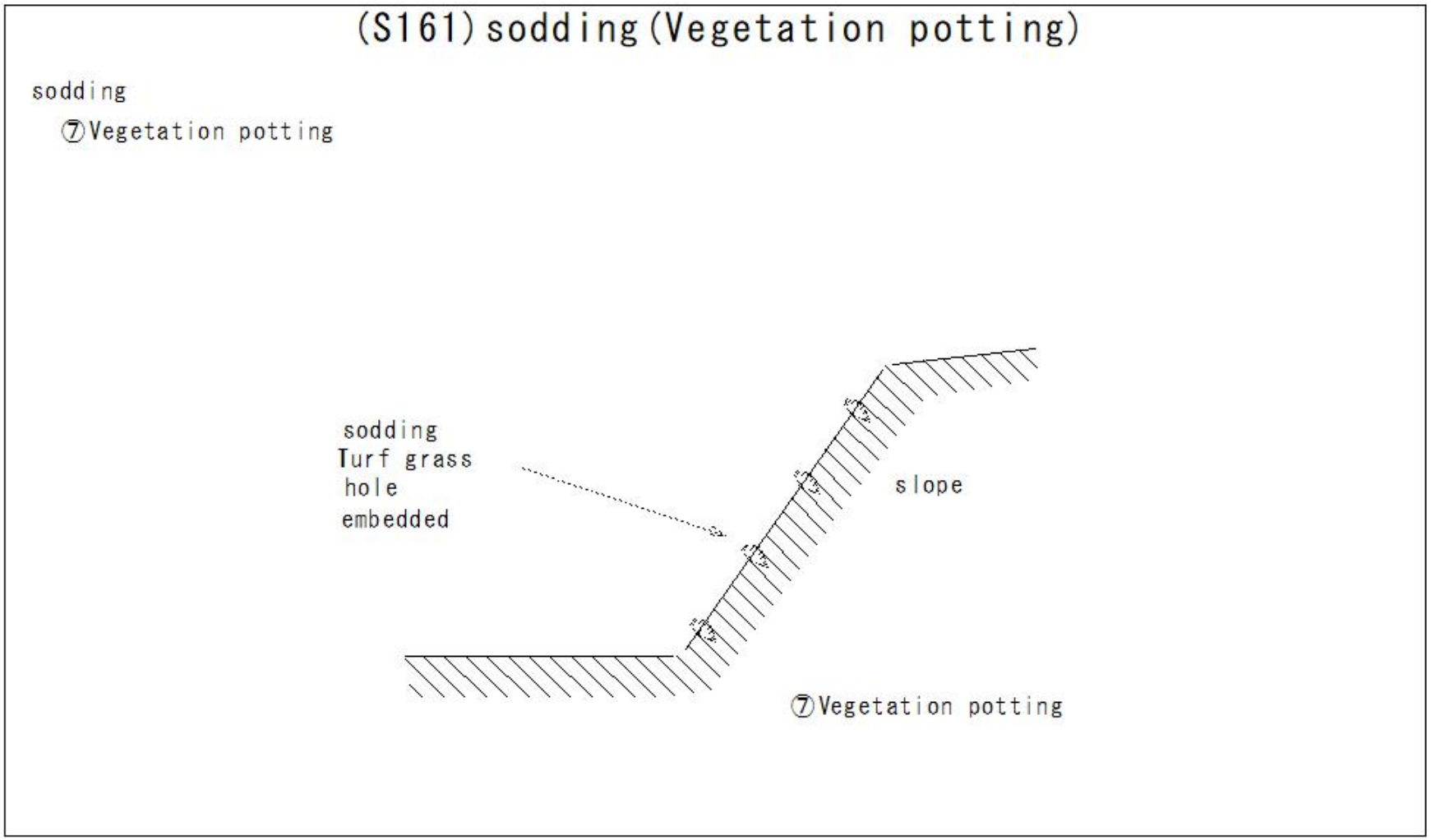
(S159)sodding(Vegetation board work)



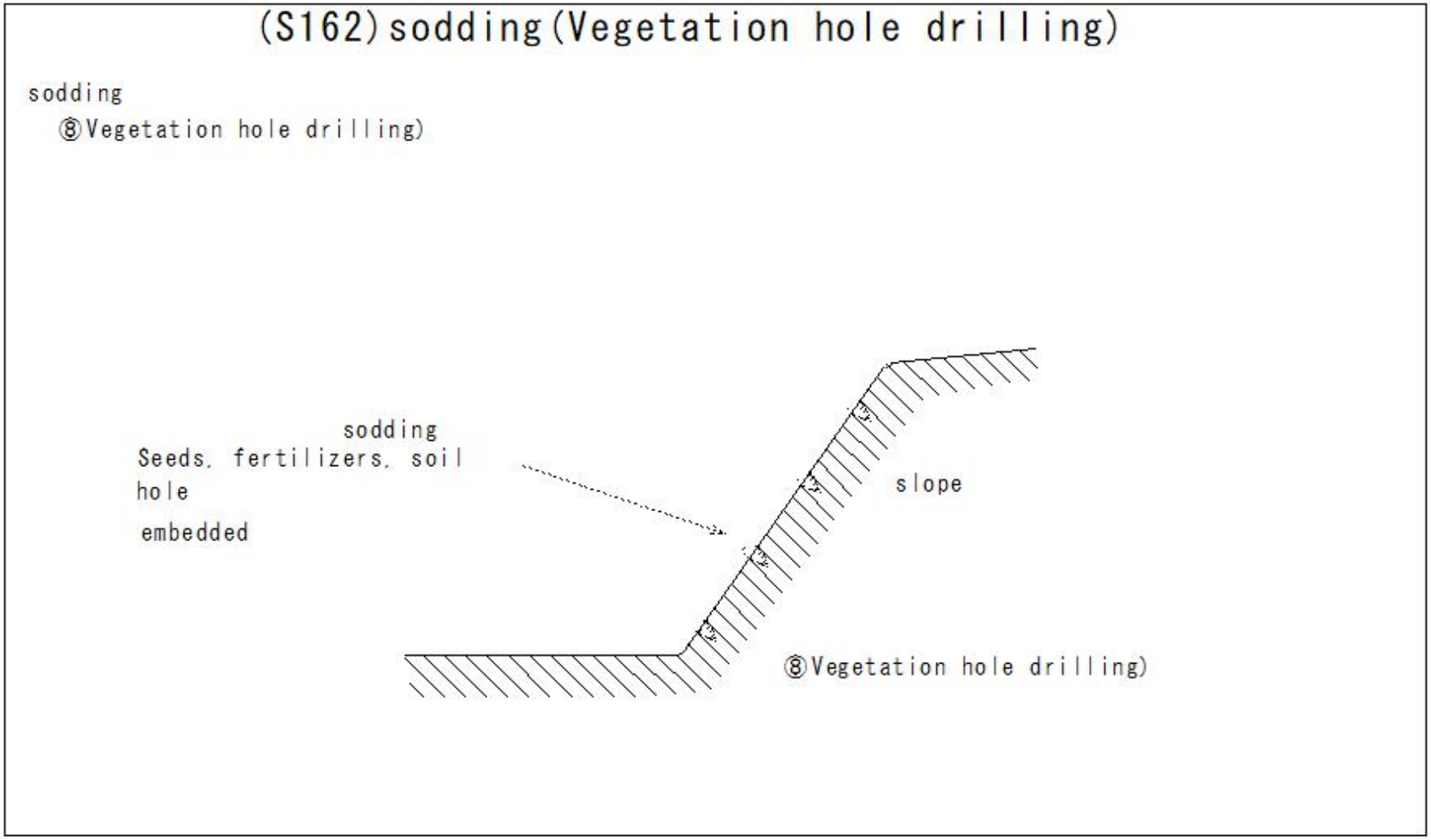
(S160)sodding(Vegetation bagging)



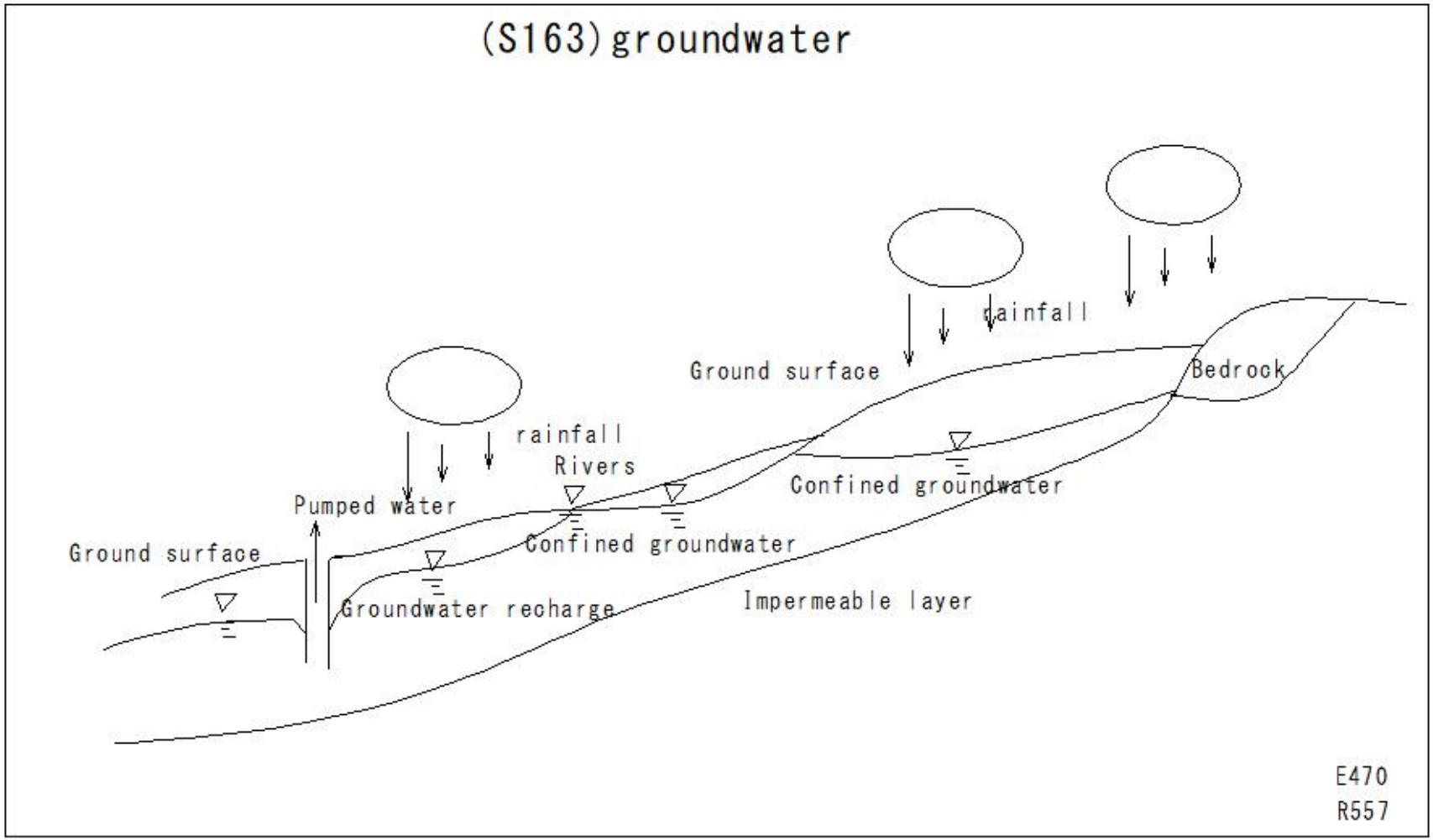
(S161)sodding(Vegetation potting)



(S162)sodding(Vegetation hole drilling)



(S163)groundwater

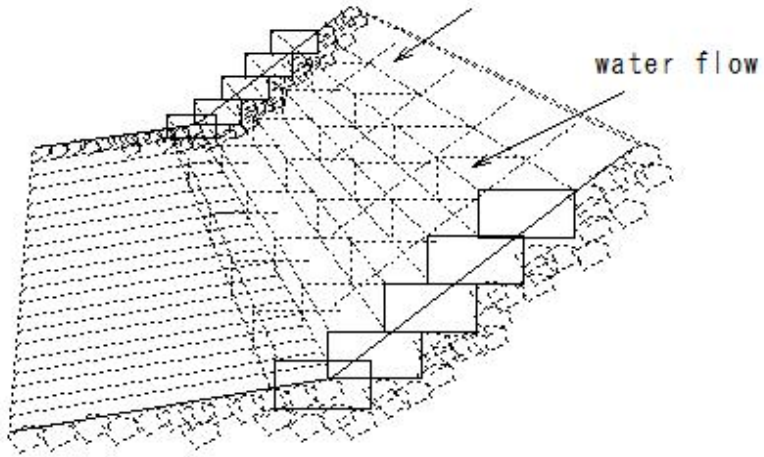


(S164)ground sill consolidation works

(S164)ground sill consolidation works

ground sill consolidation works
Stabilizes riverbeds and major bed
cross the river

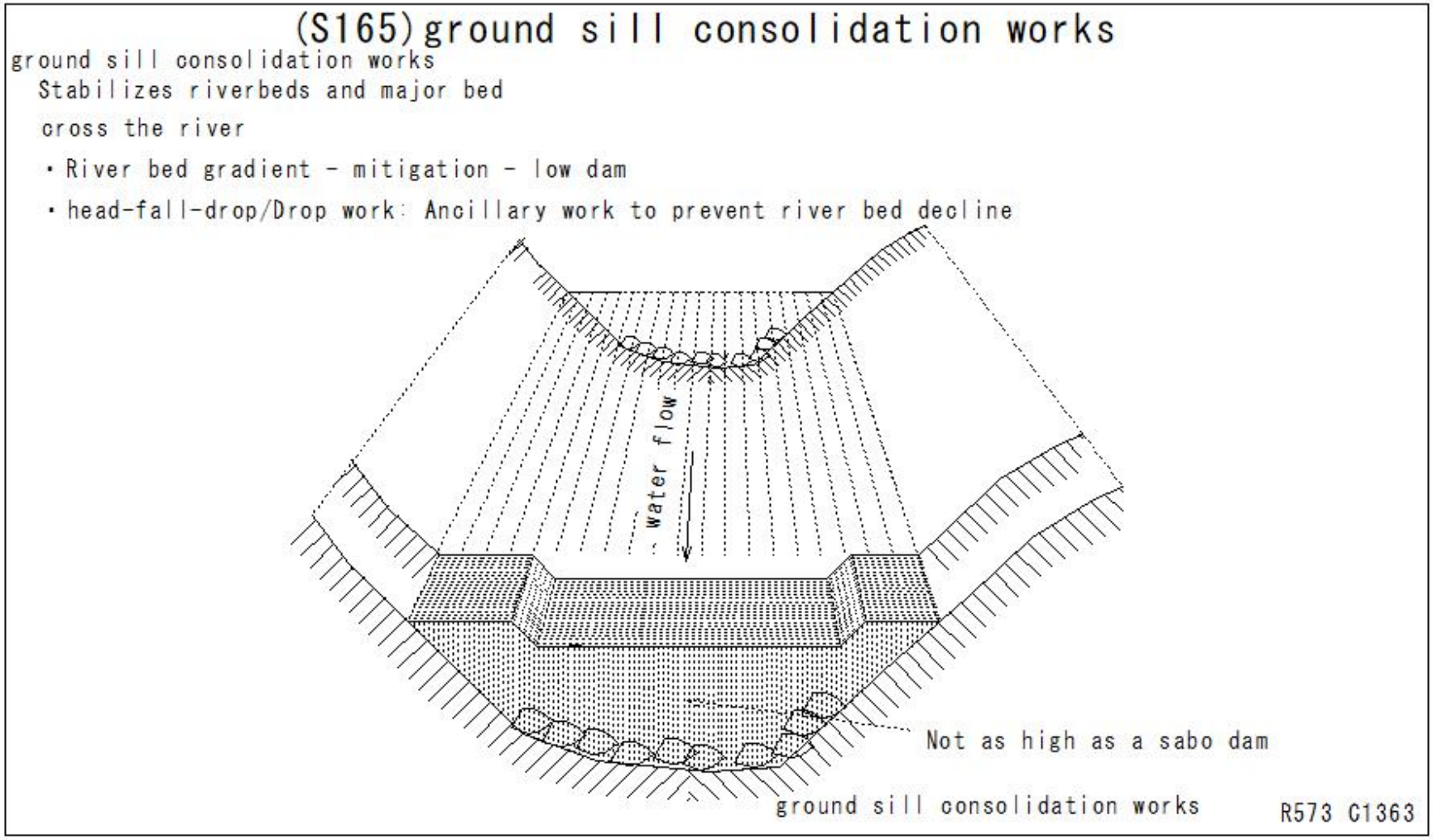
- River bed gradient - mitigation - low dam
- head-fall-drop/Drop work: Ancillary work to prevent river bed decline



ground sill consolidation works

R569 C1359

(S165)ground sill consolidation works

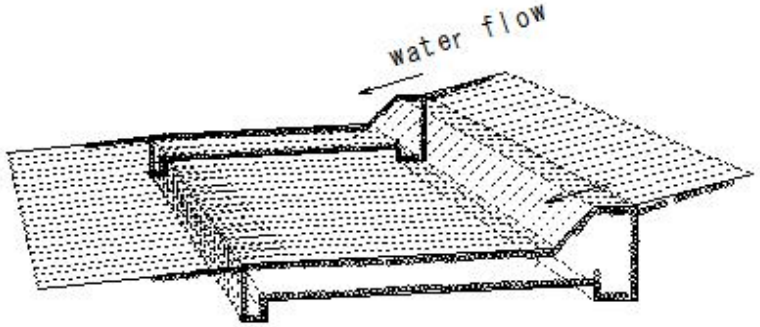


(S166)ground sill consolidation works

(S166)ground sill consolidation works

ground sill consolidation works
Stabilizes riverbeds and major bed
cross the river

- River bed gradient - mitigation - low dam
- head-fall-drop/Drop work: Ancillary work to prevent river bed decline



ground sill consolidation works

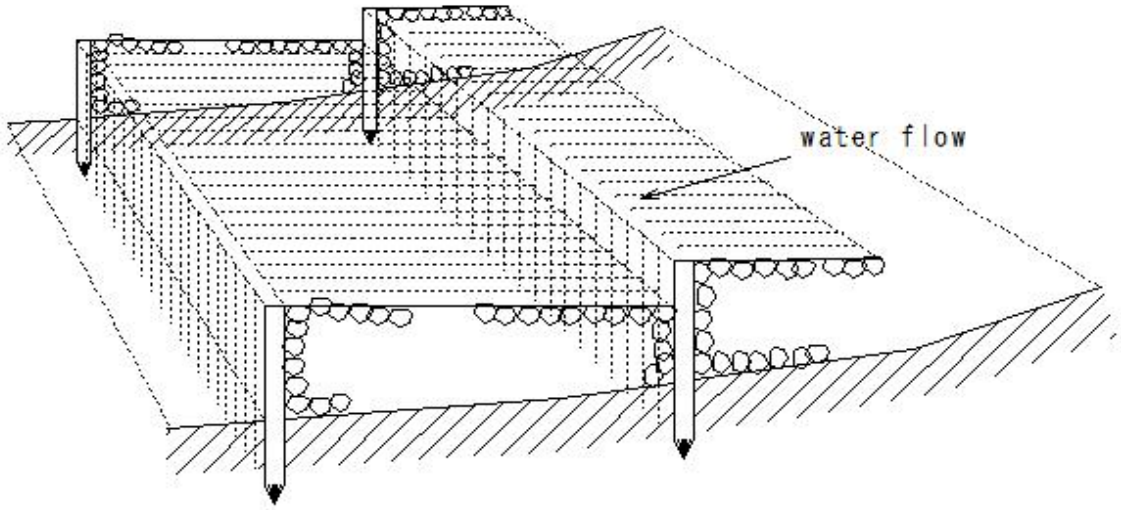
R570 C1360

(S167)ground sill consolidation works

(S167)ground sill consolidation works

ground sill consolidation works
Stabilizes riverbeds and major bed
cross the river

- River bed gradient - mitigation - low dam
- head-fall-drop/Drop work: Ancillary work to prevent river bed decline



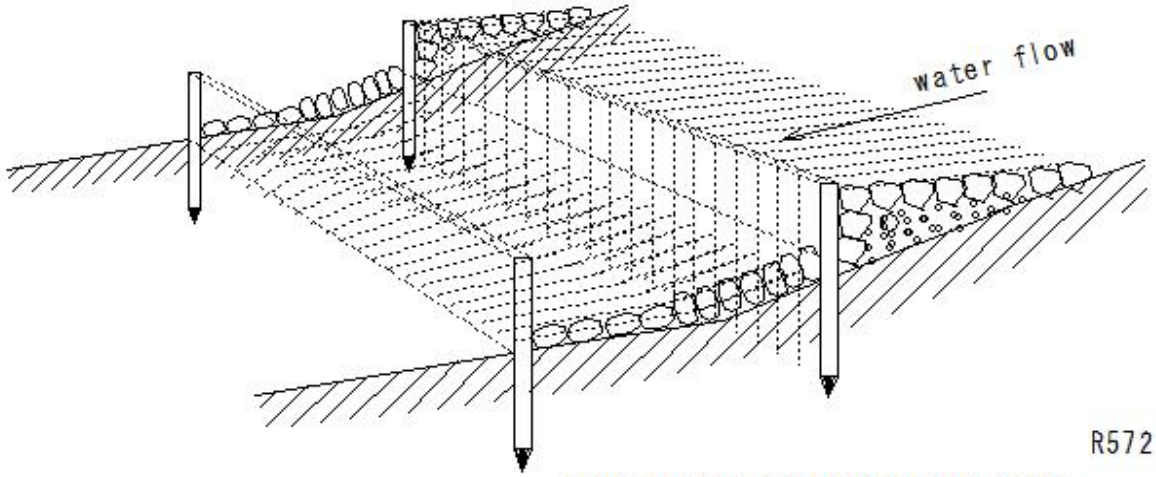
ground sill consolidation works R571 C1361

(S168)ground sill consolidation works

(S168)ground sill consolidation works

ground sill consolidation works
Stabilizes riverbeds and major bed
cross the river

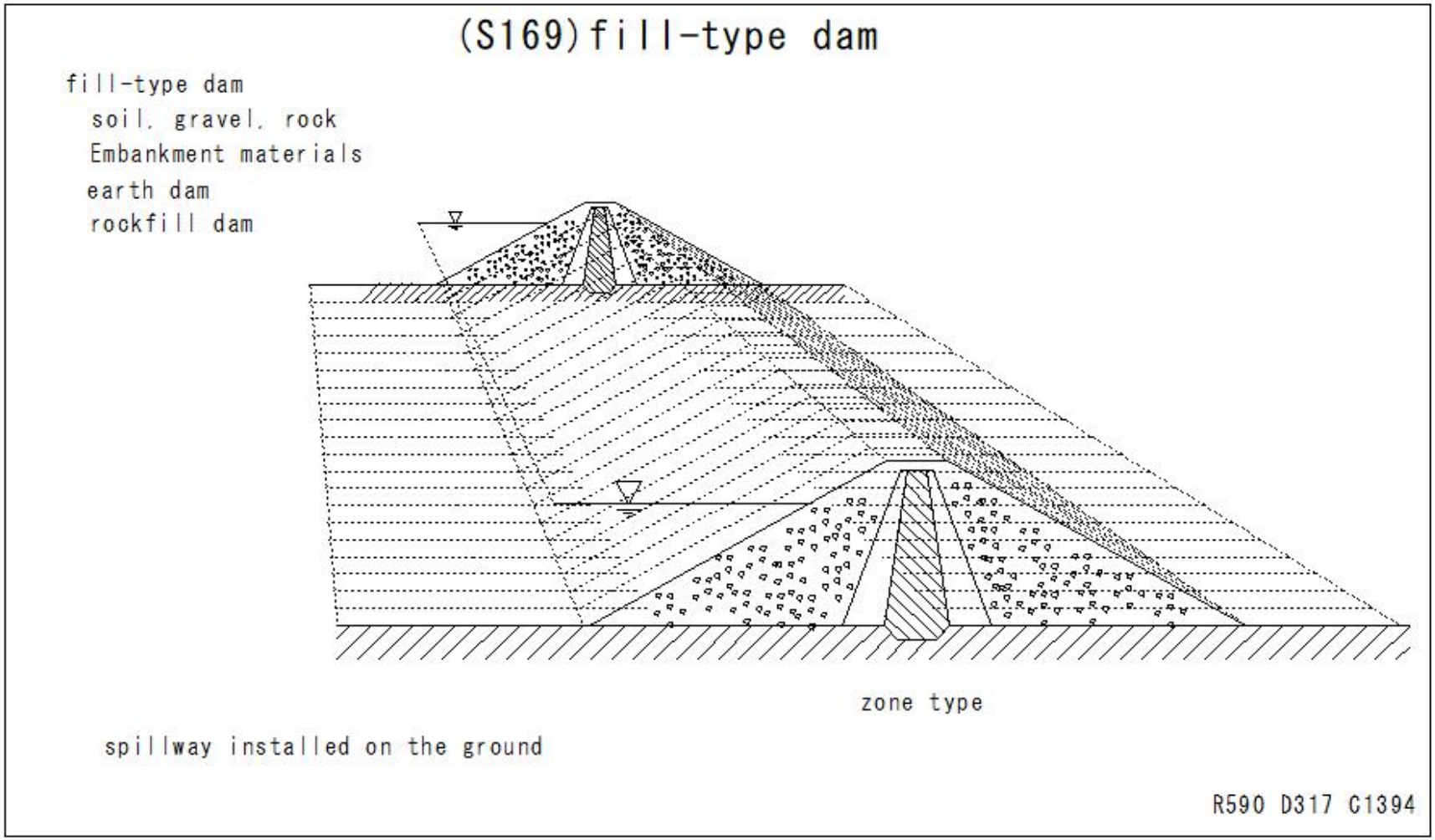
- River bed gradient - mitigation - low dam
- head-fall-drop/Drop work: Ancillary work to prevent river bed decline



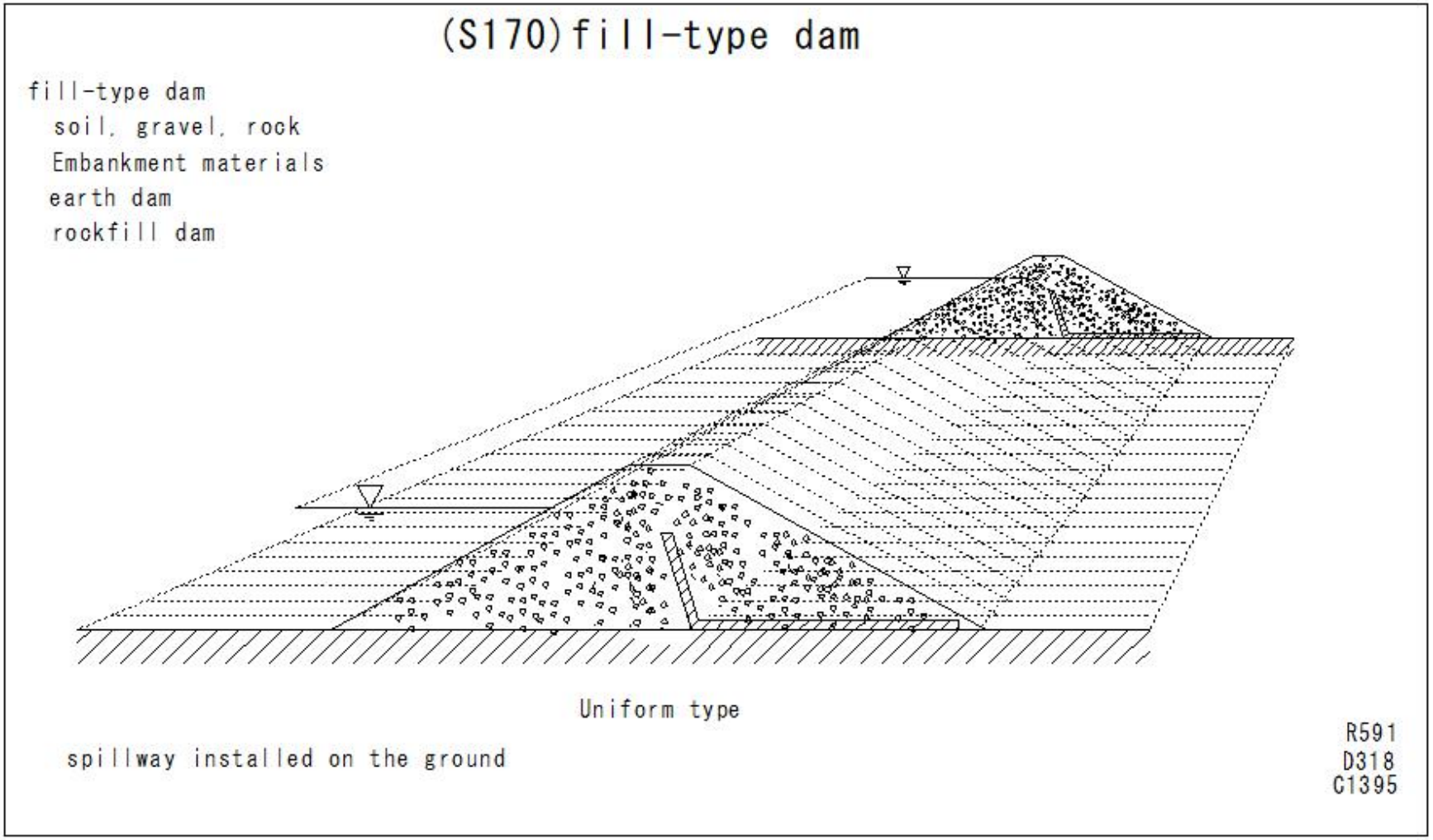
R572 C1362

ground sill consolidation works

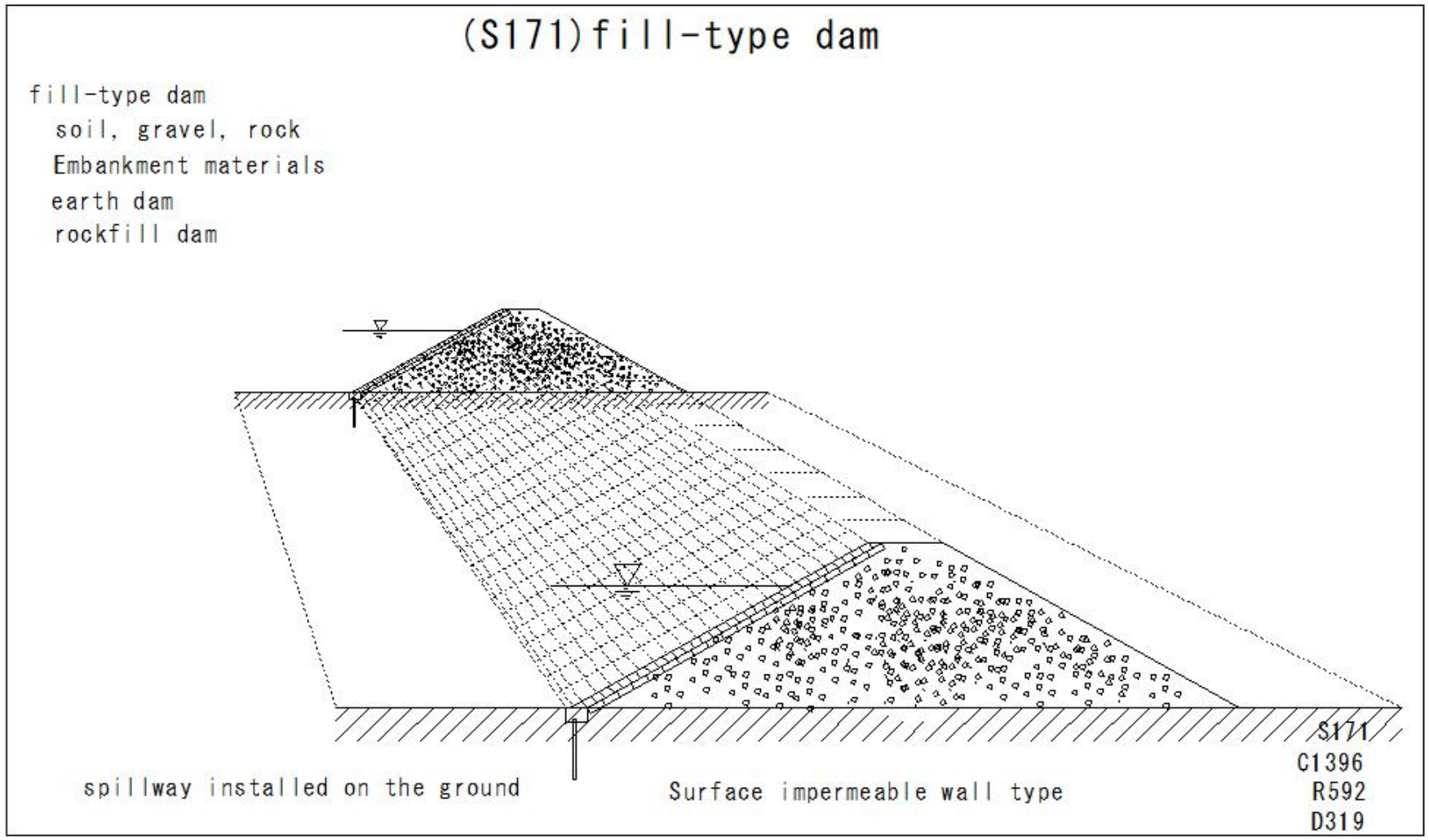
(S169)fill-type dam



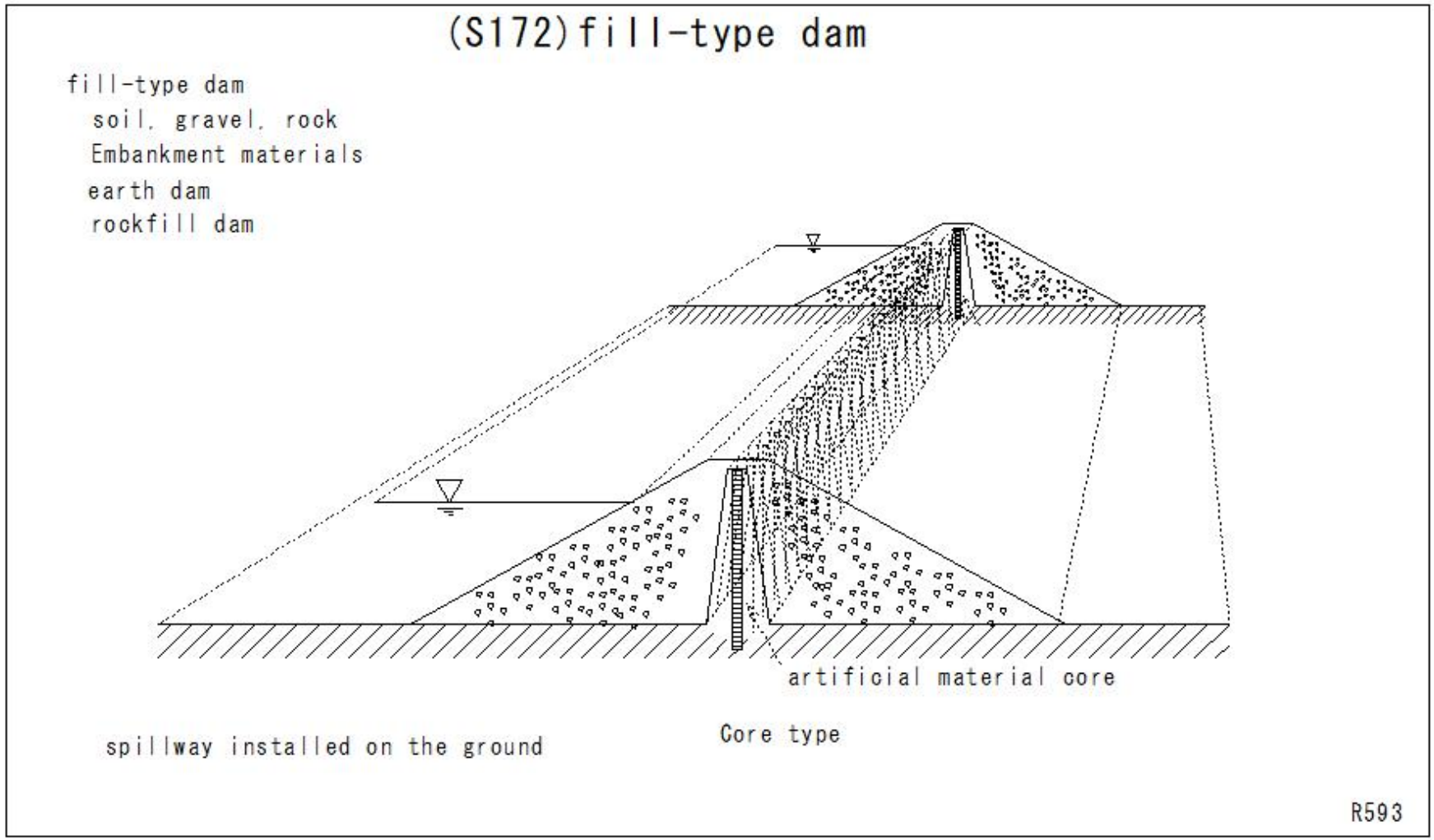
(S170)fill-type dam



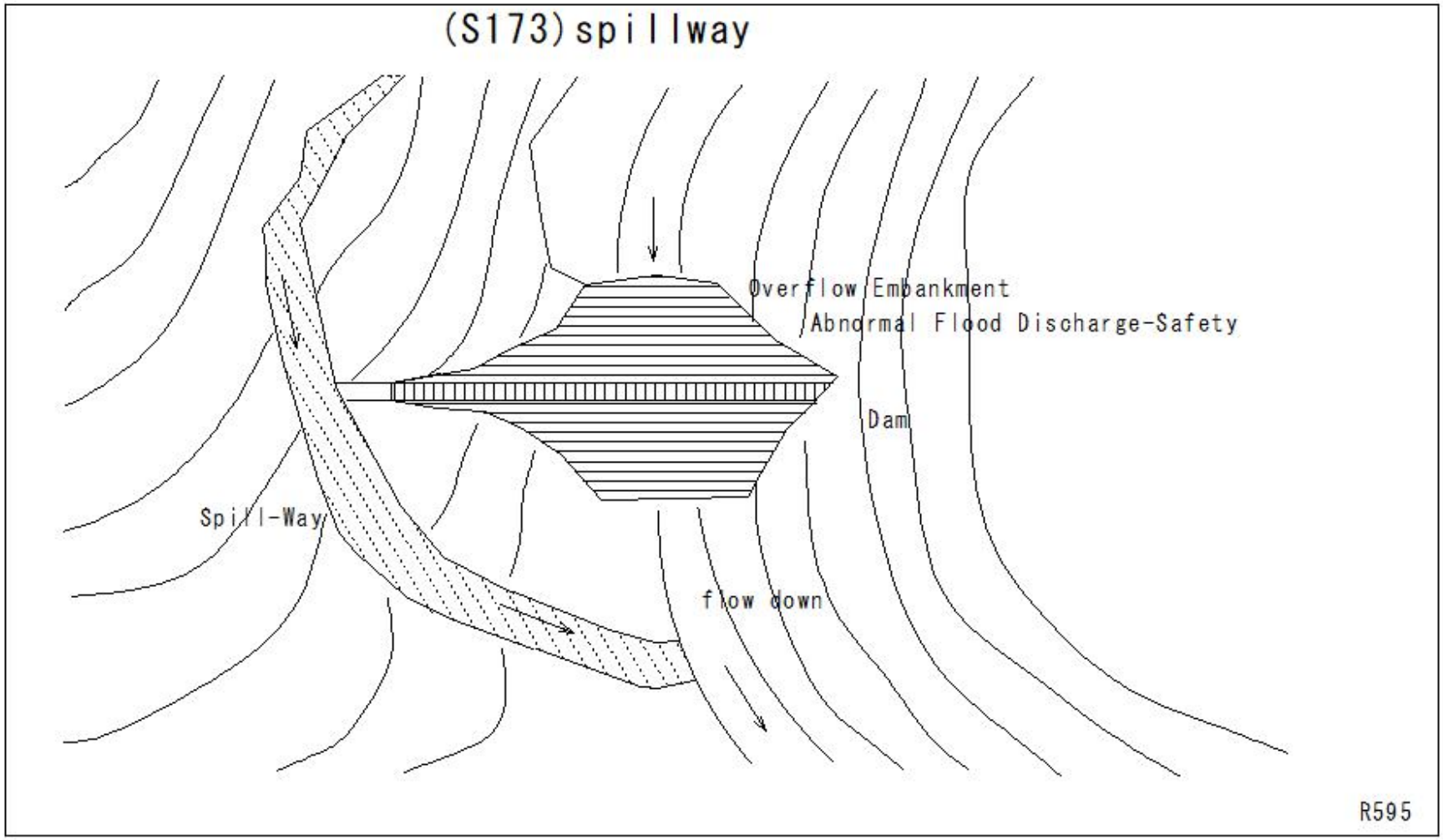
(S171)fill-type dam



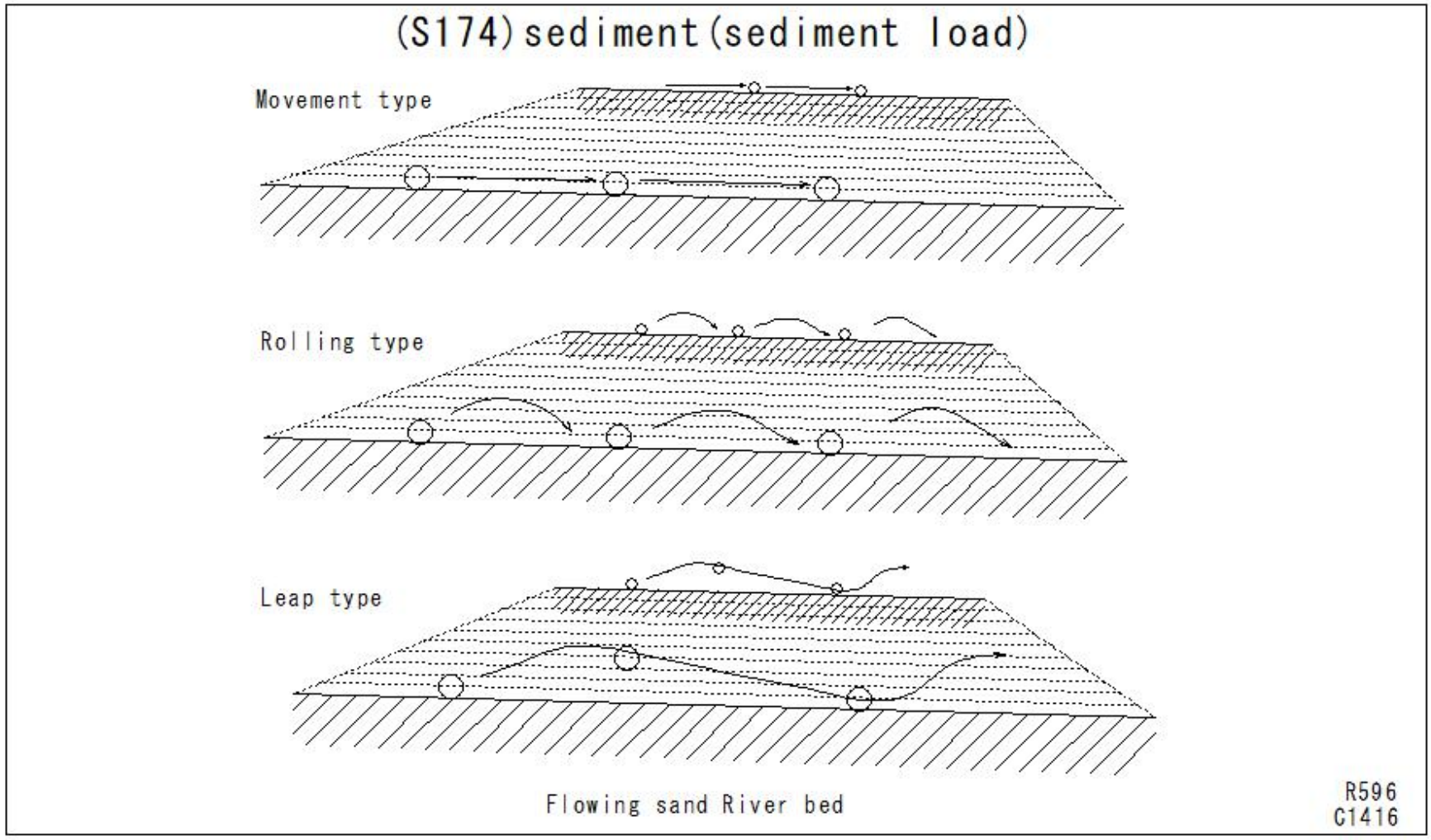
(S172)fill-type dam



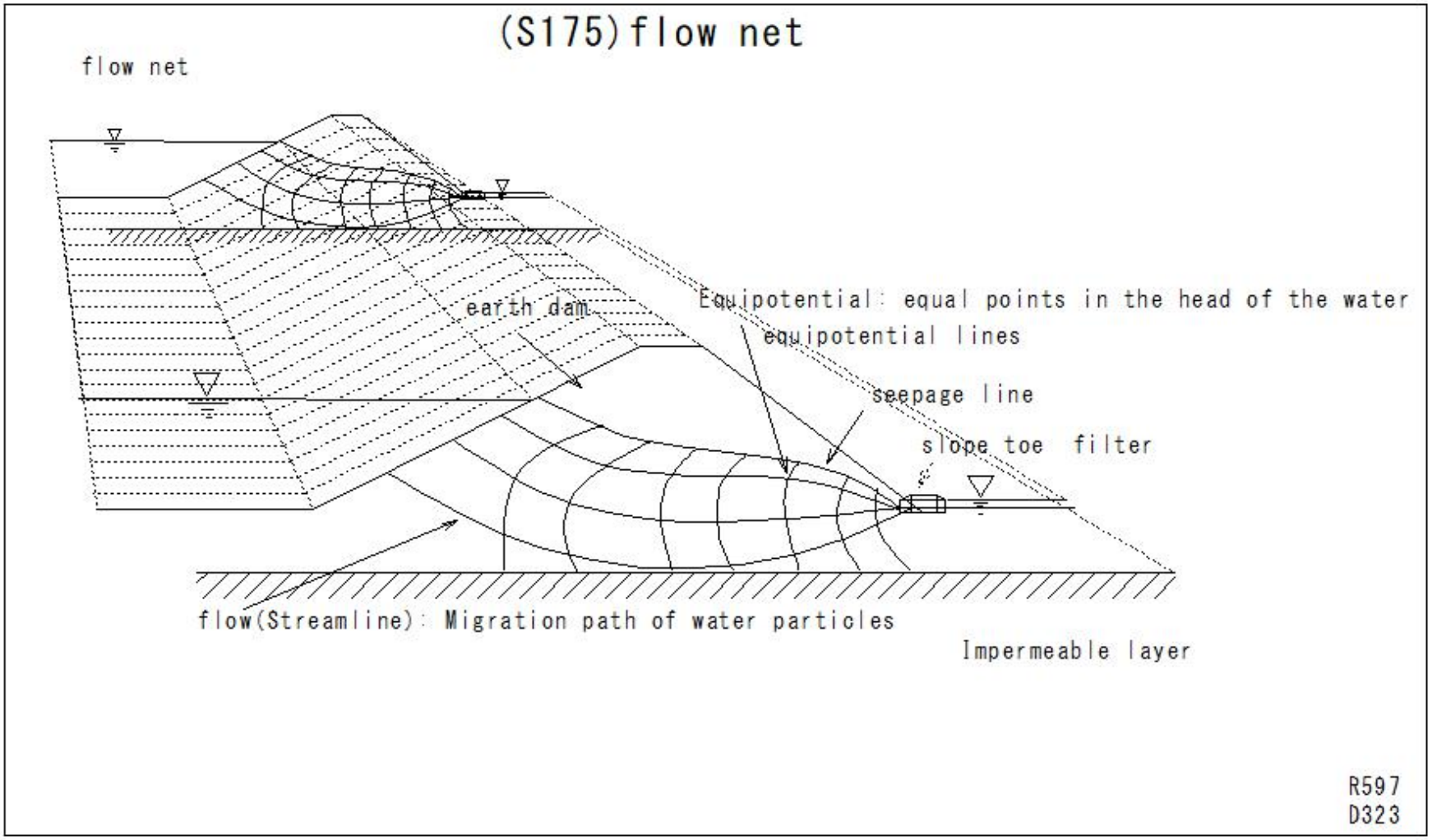
(S173)spillway



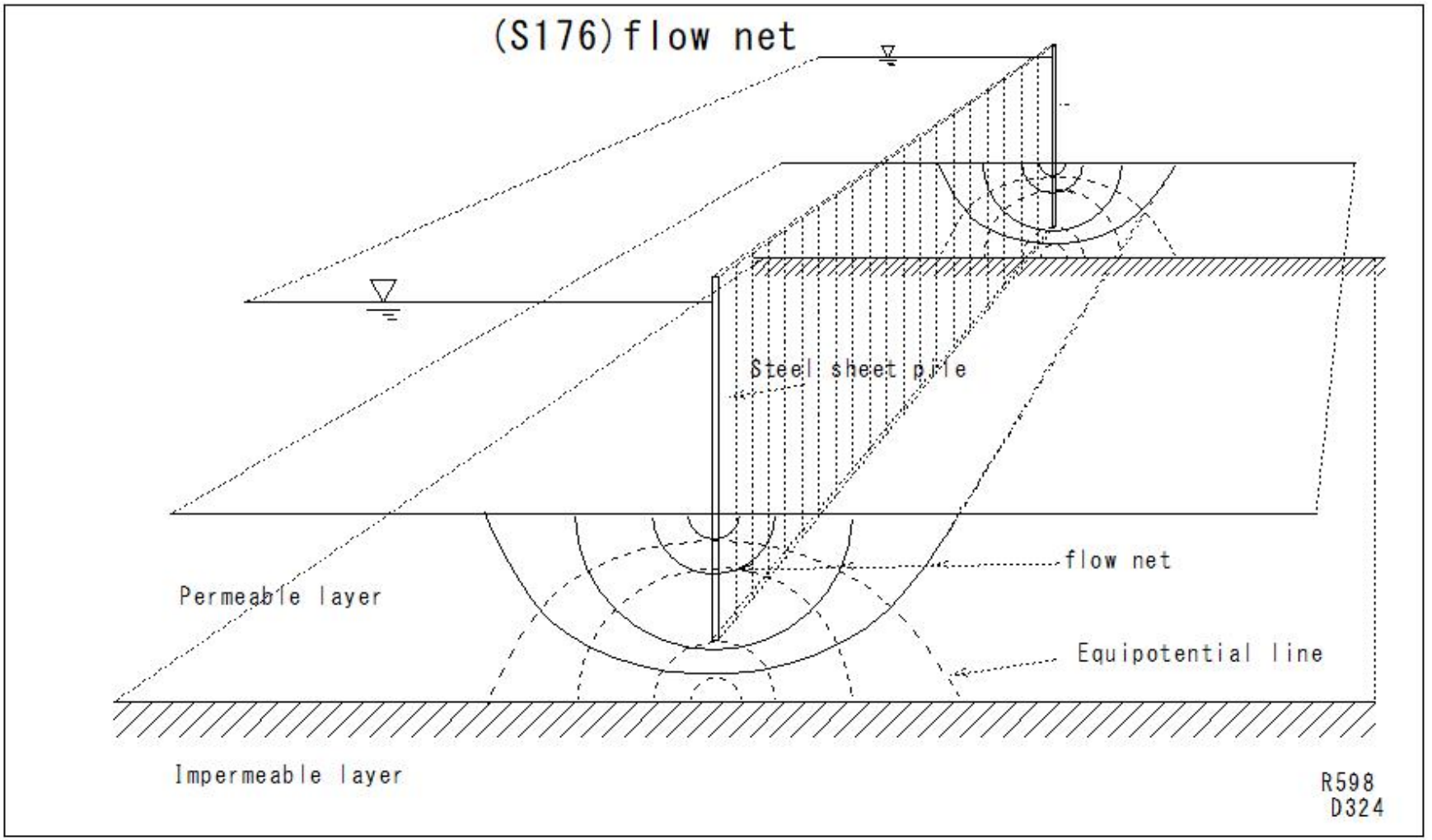
(S174)sediment



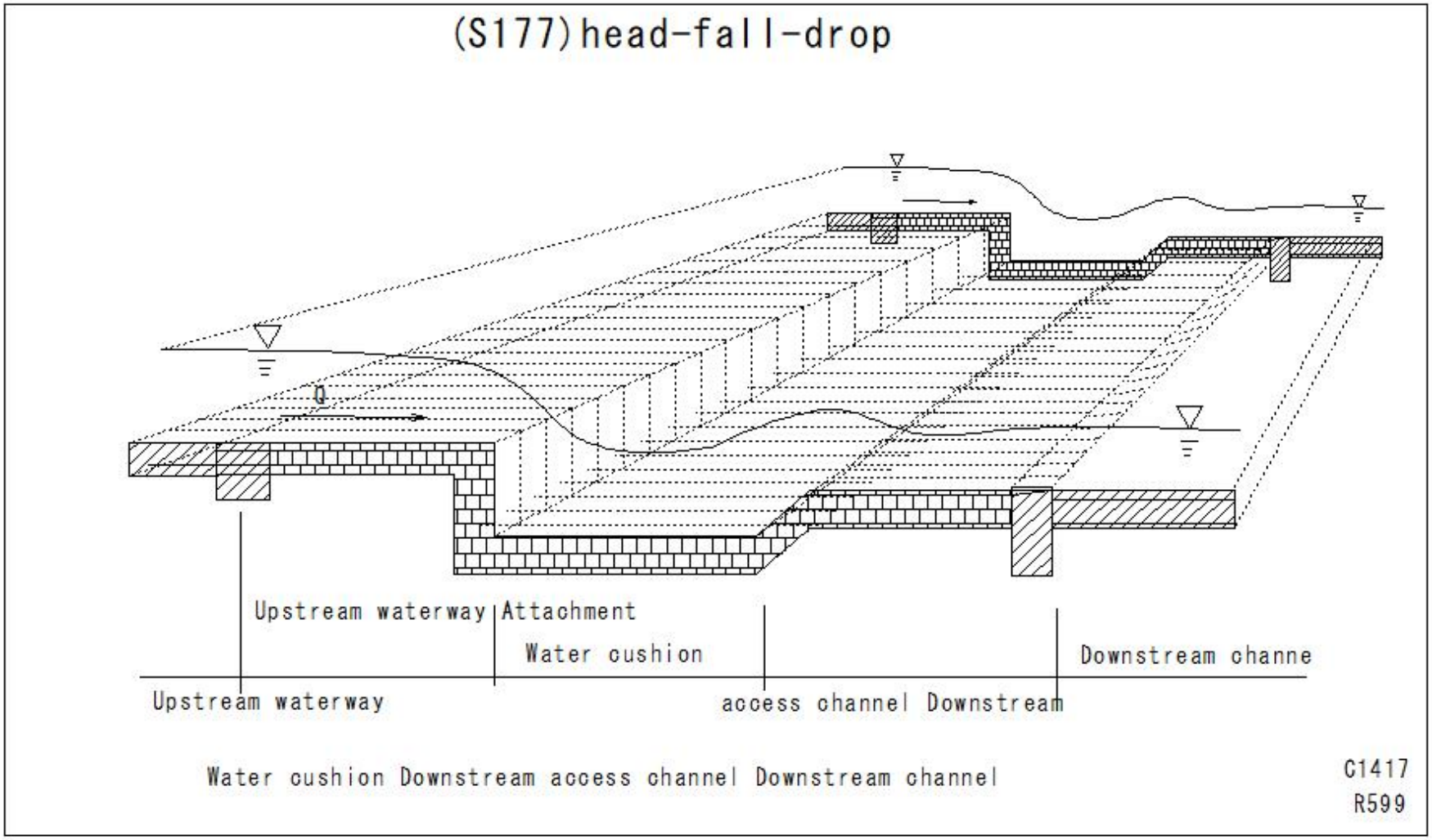
(S175)flow net



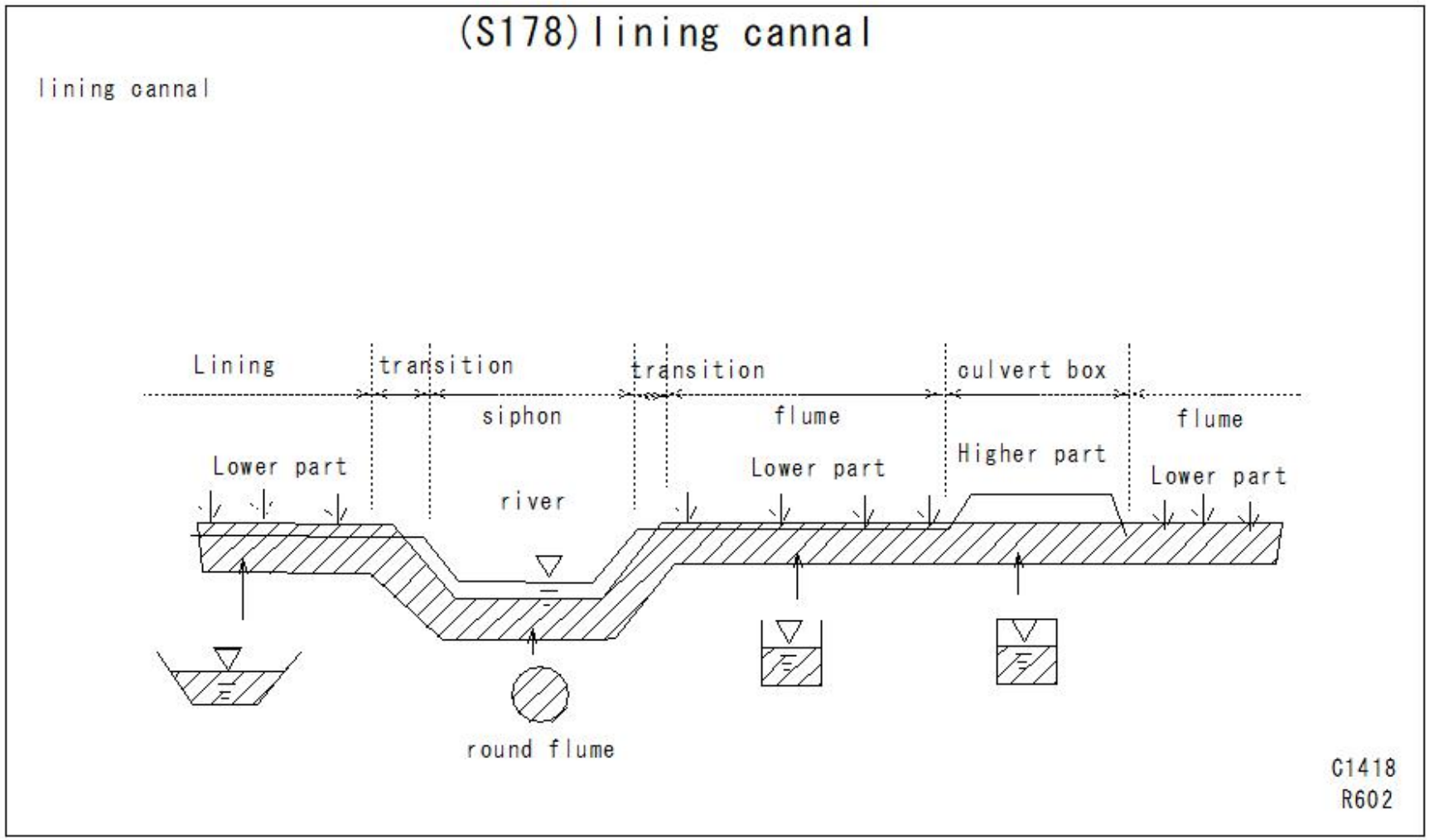
(S176)flow net



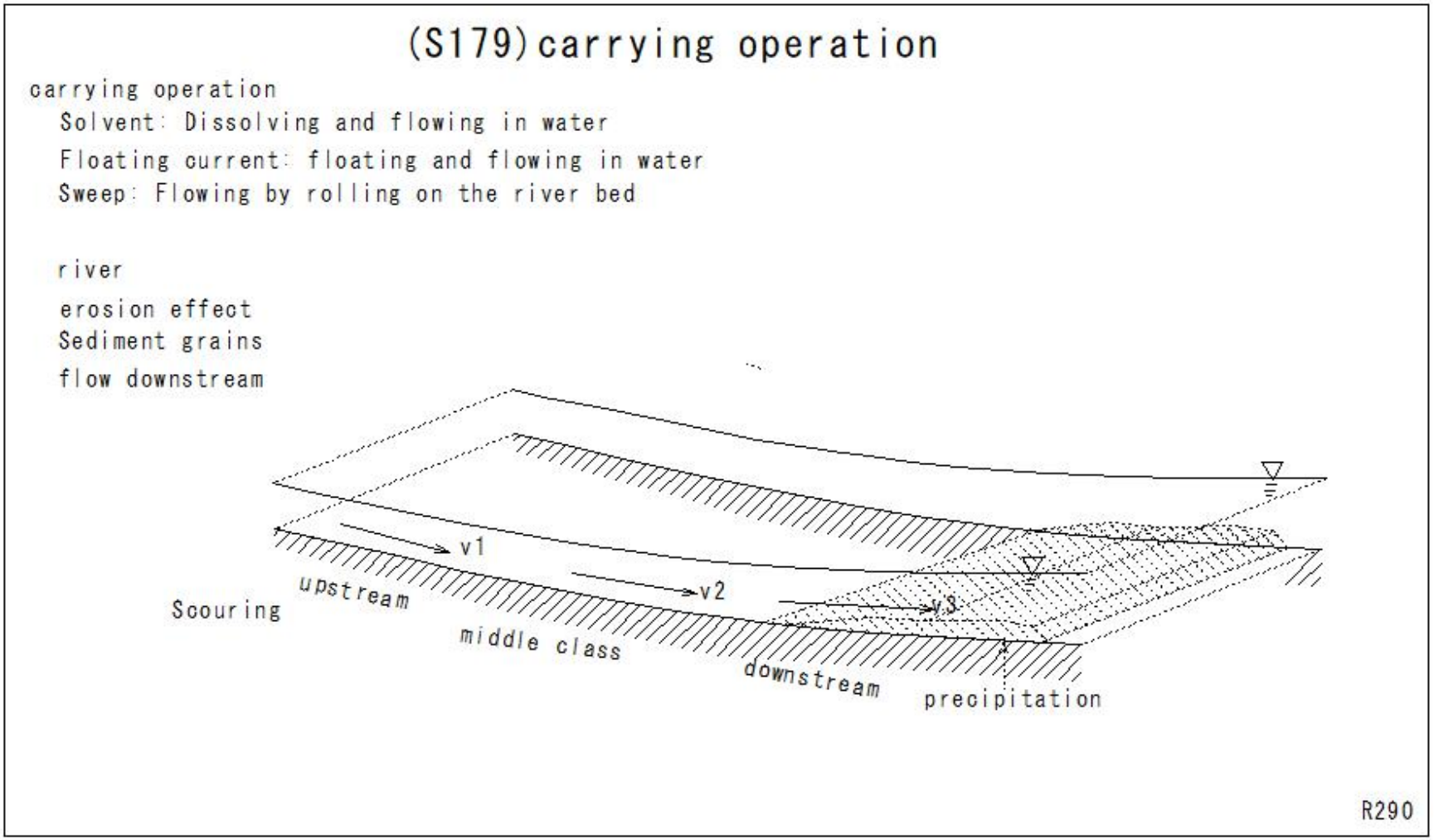
(S177)head-fall-drop



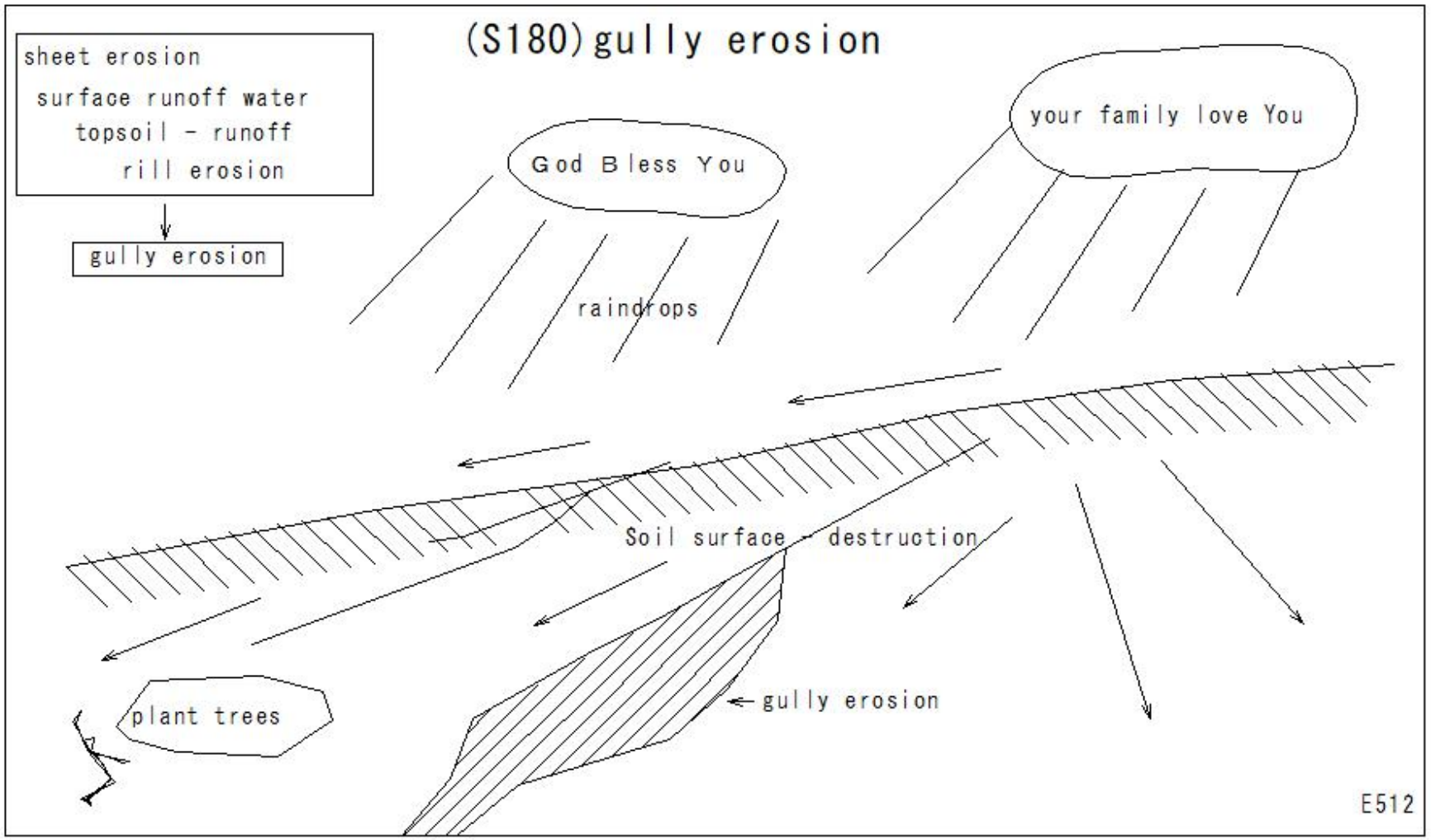
(S178)lining canal



(S179)carrying operation



(S180)gully erosion



(S181)torrent control works

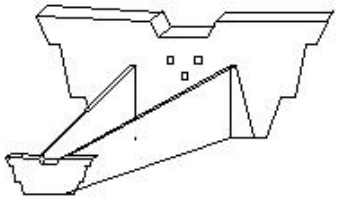
(S181) torrent control works

torrent control works

Mountain stream bed stabilization work

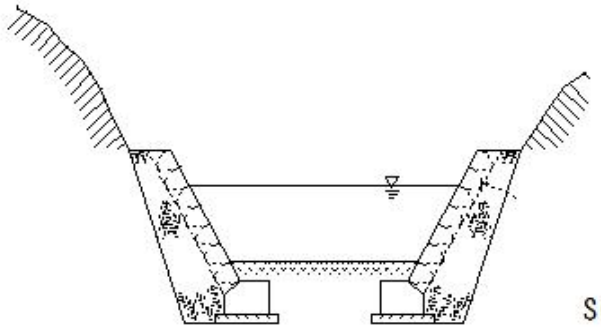
- Preventing sand and gravel from flowing out
- River bed: Prevention of river bank erosion
- Dam construction, bank protection work, revetment, channel construction

check dam



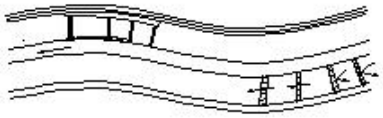
S128

revetment



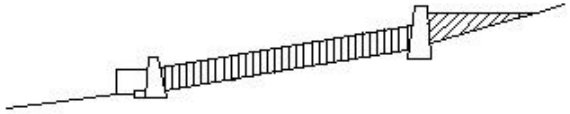
S67

groin



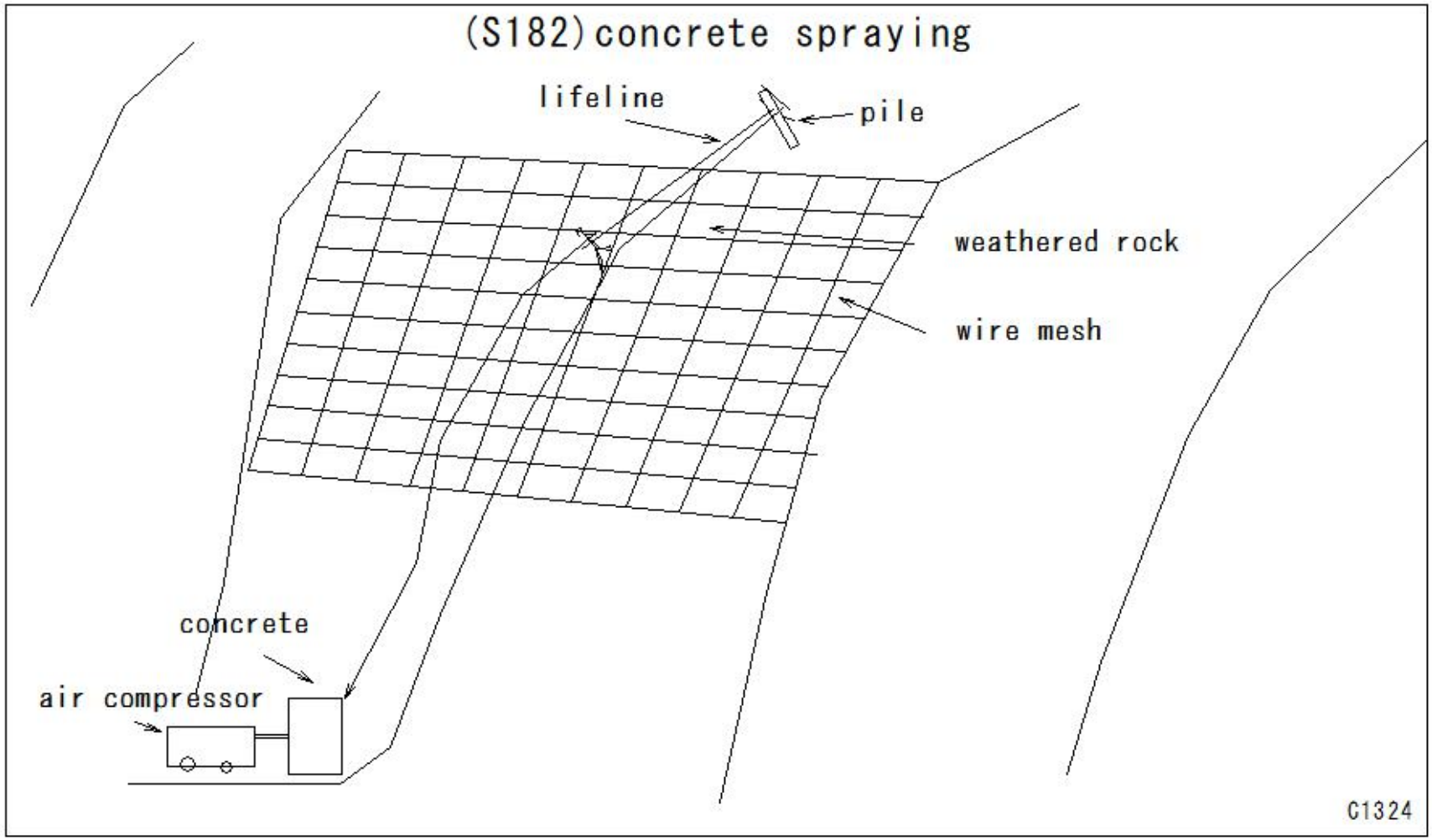
S145

watercourse

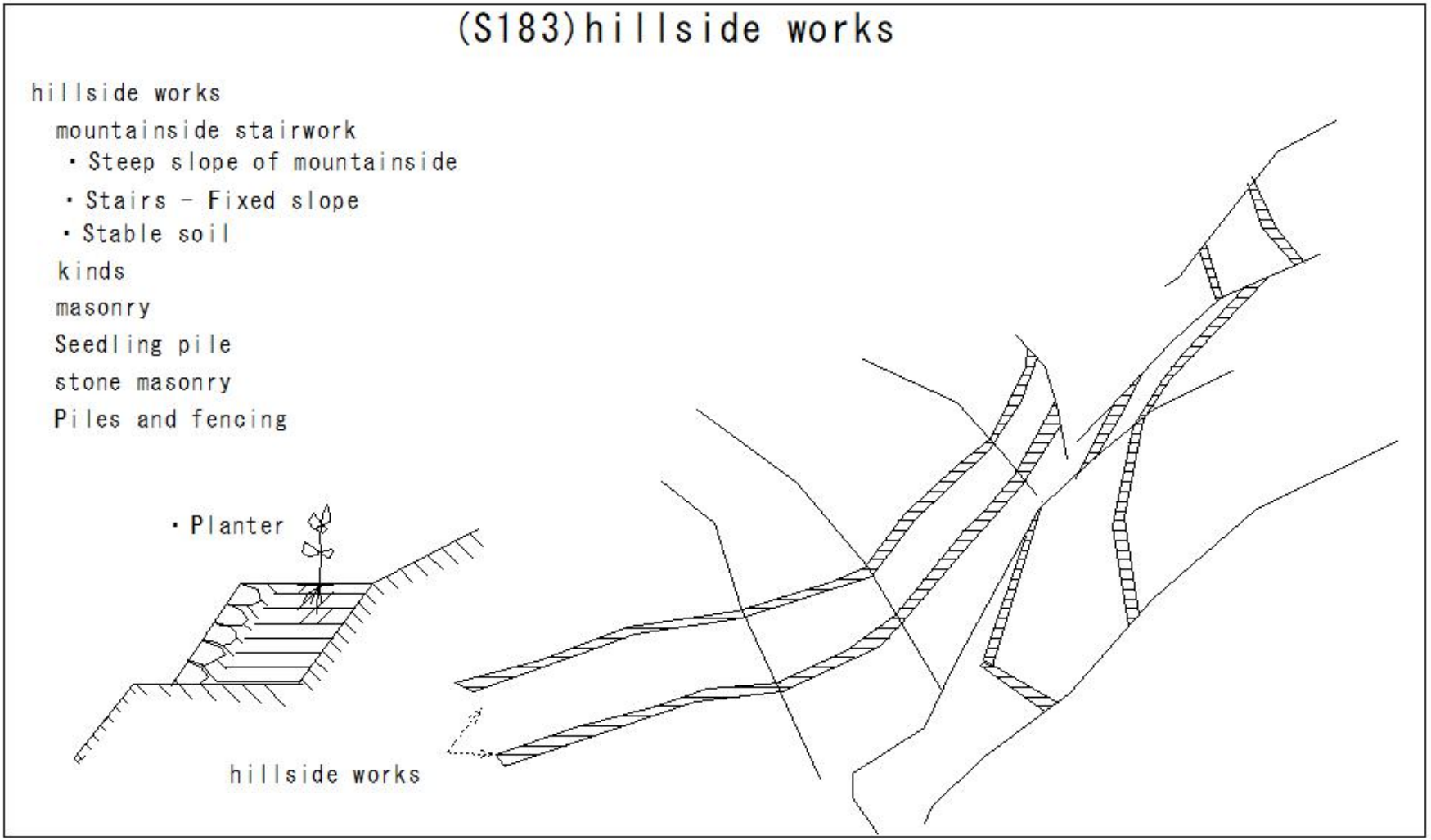


S142

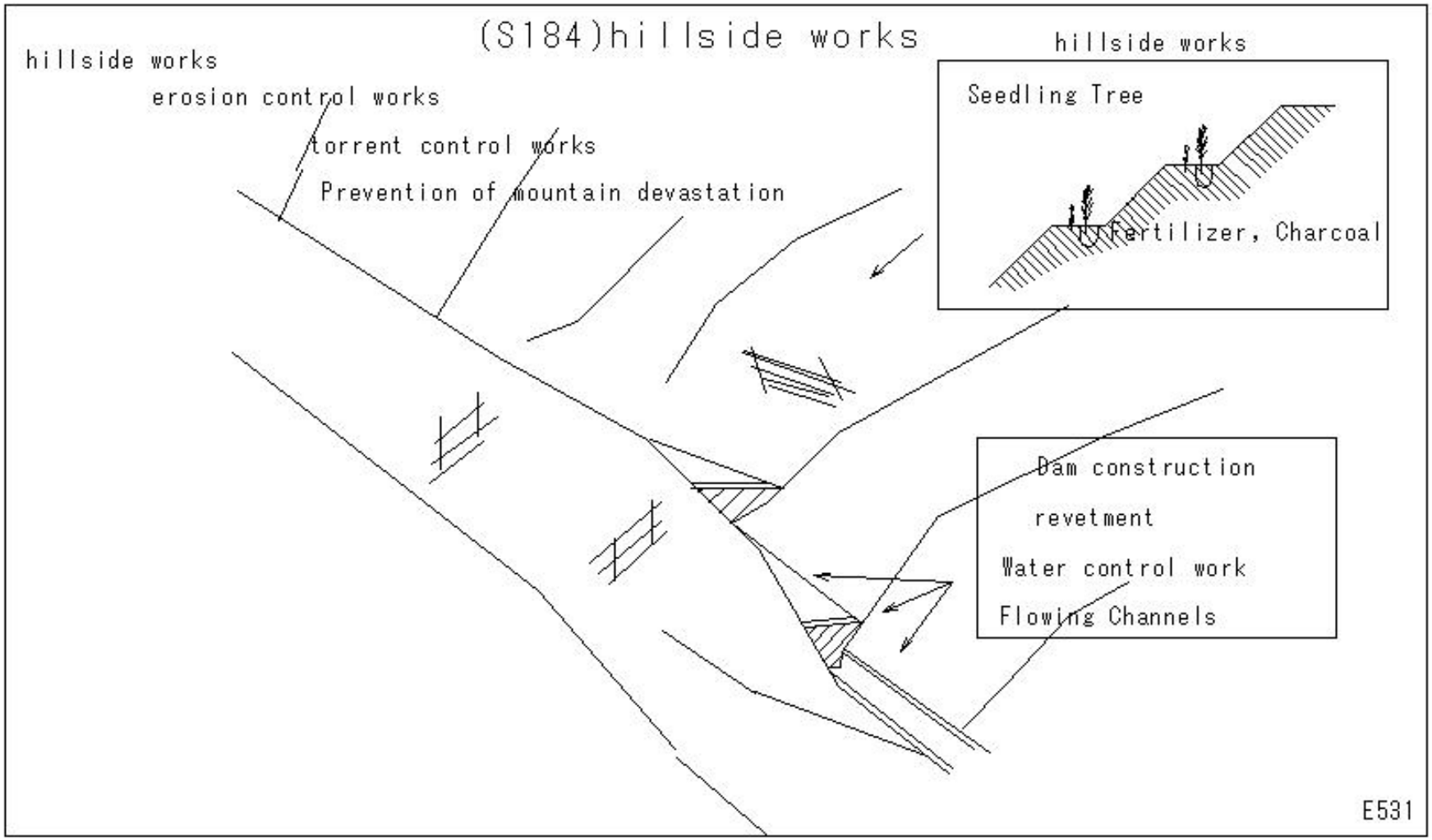
(S182)concrete spraying



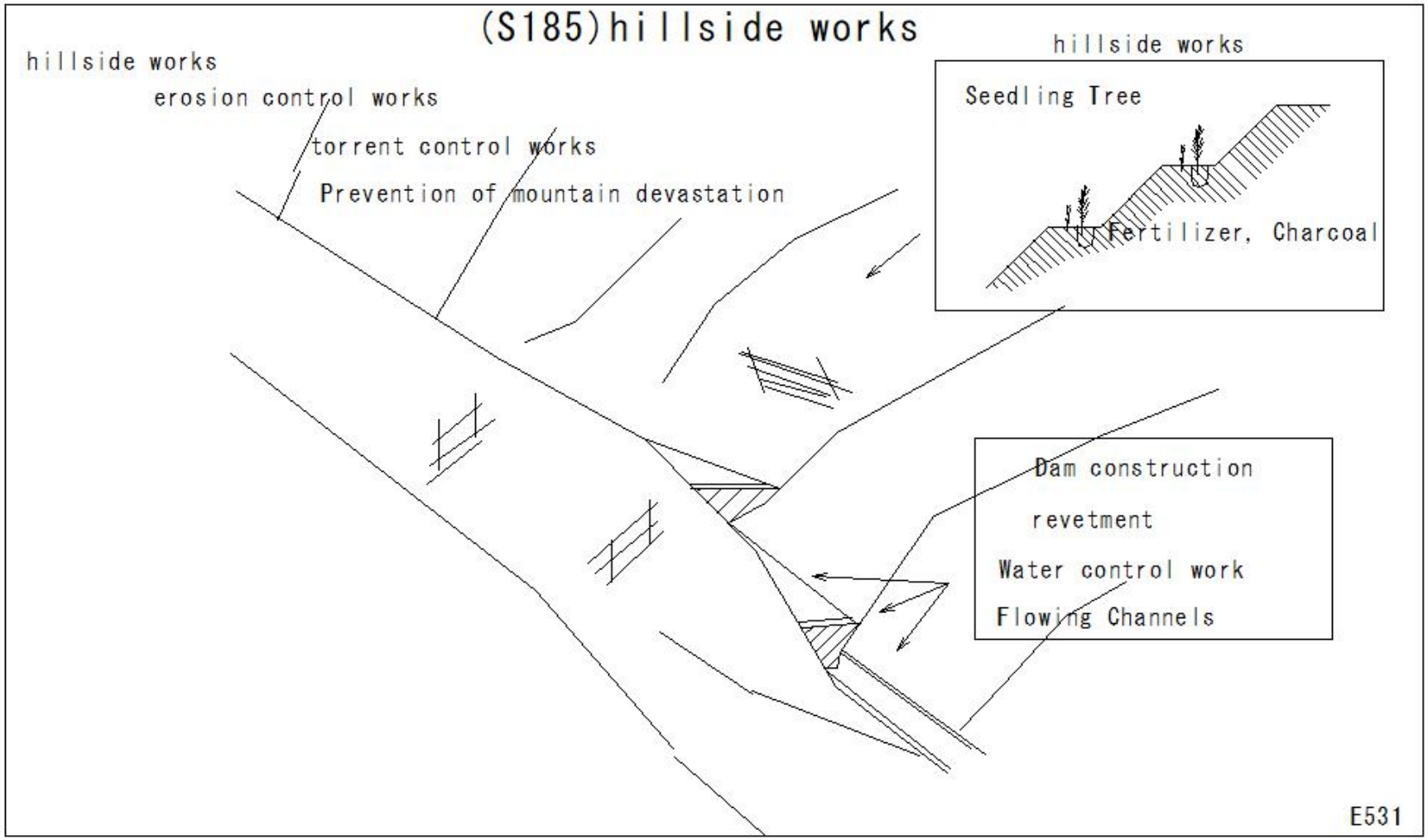
(S183)hillside works



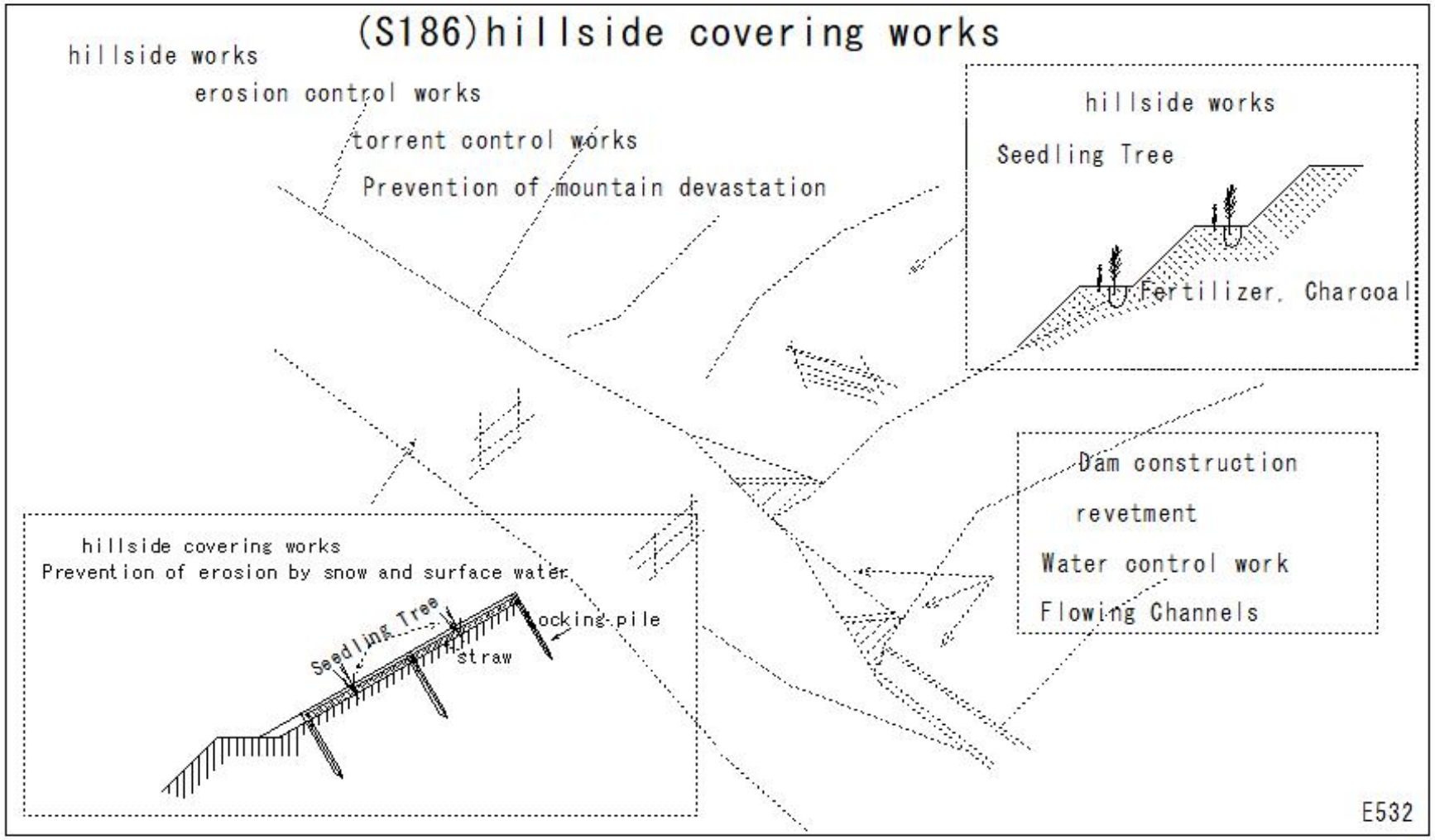
(S184)hillside works



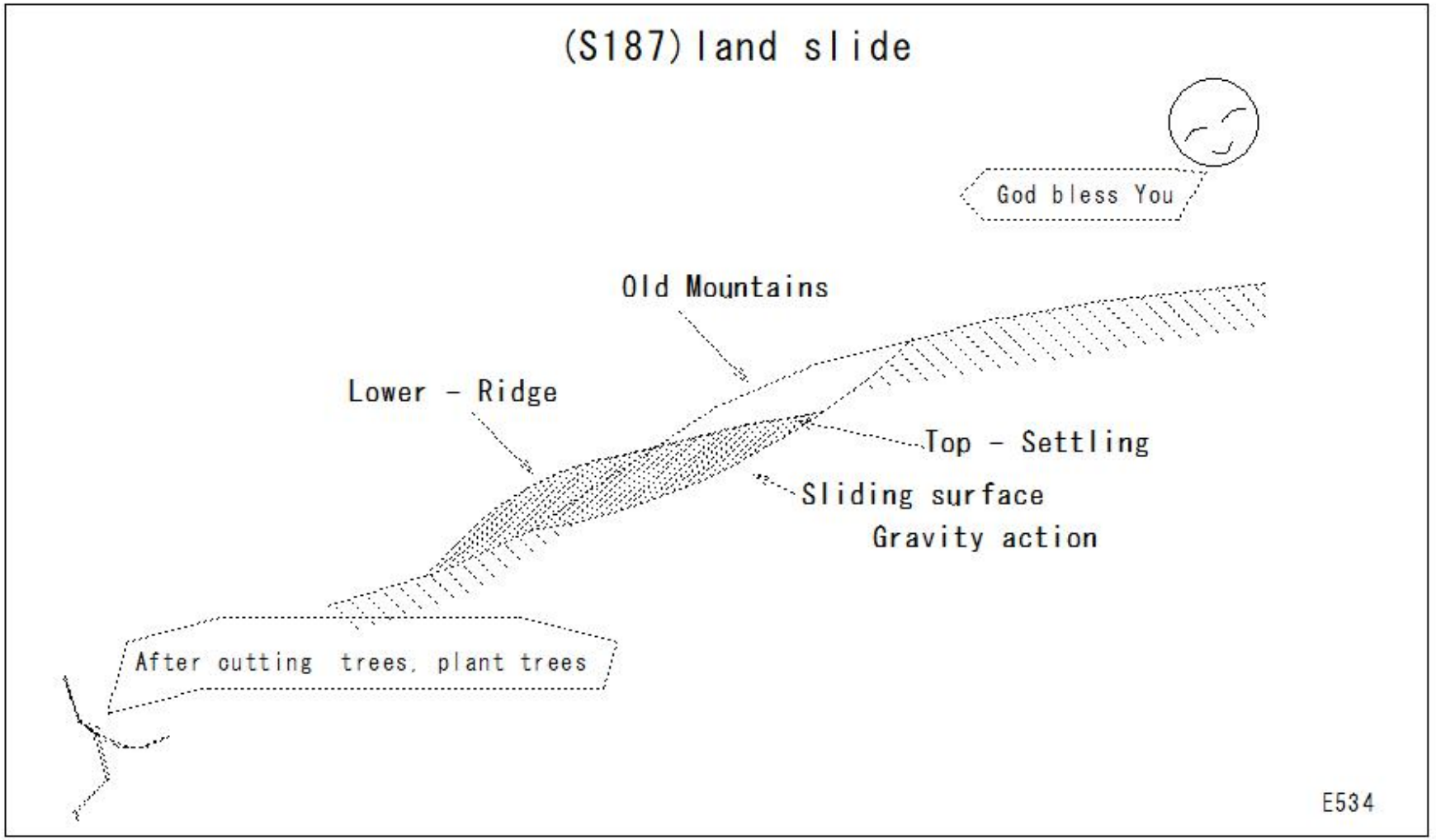
(S185)hillside works



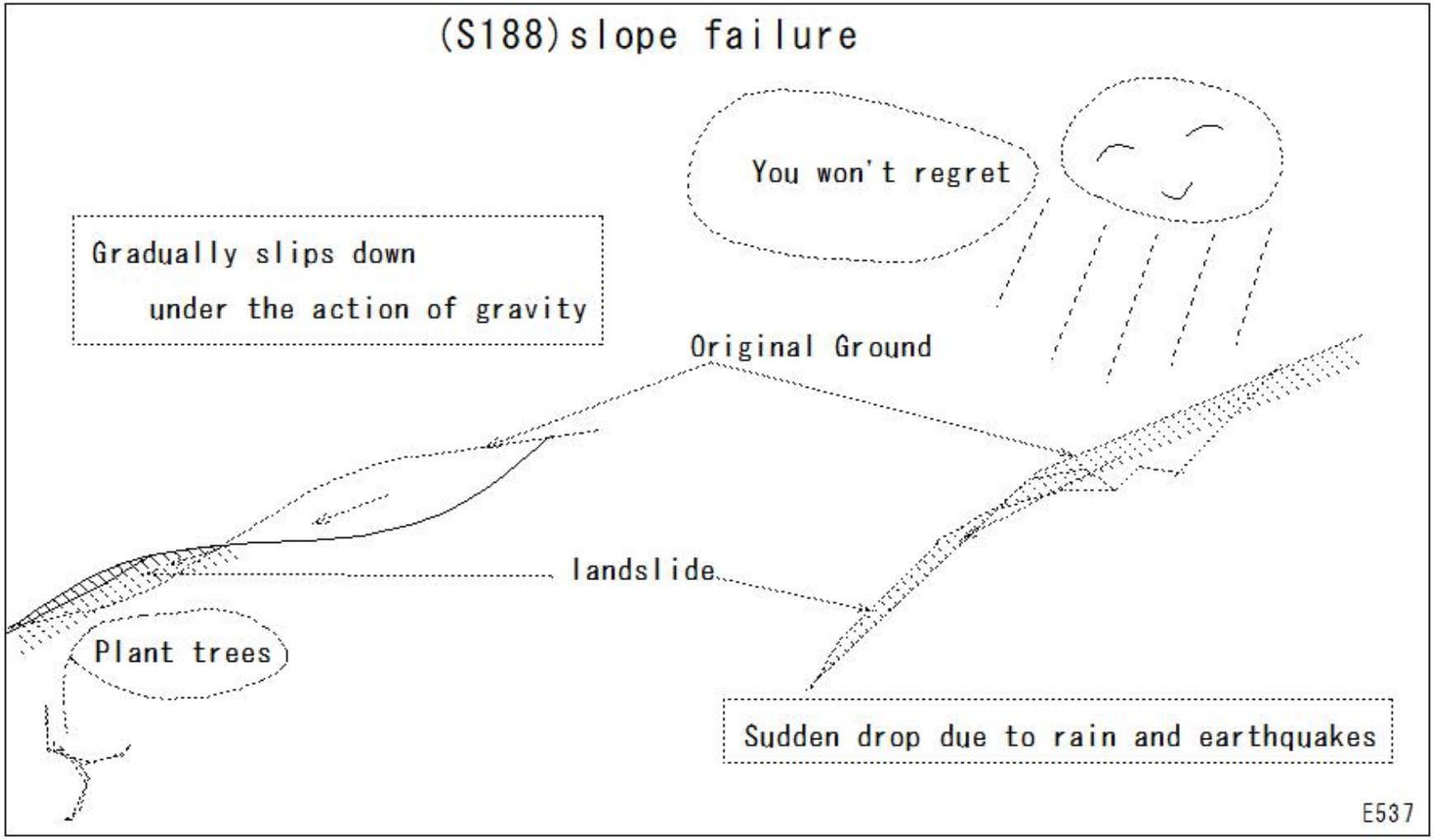
(S186)hillside covering works



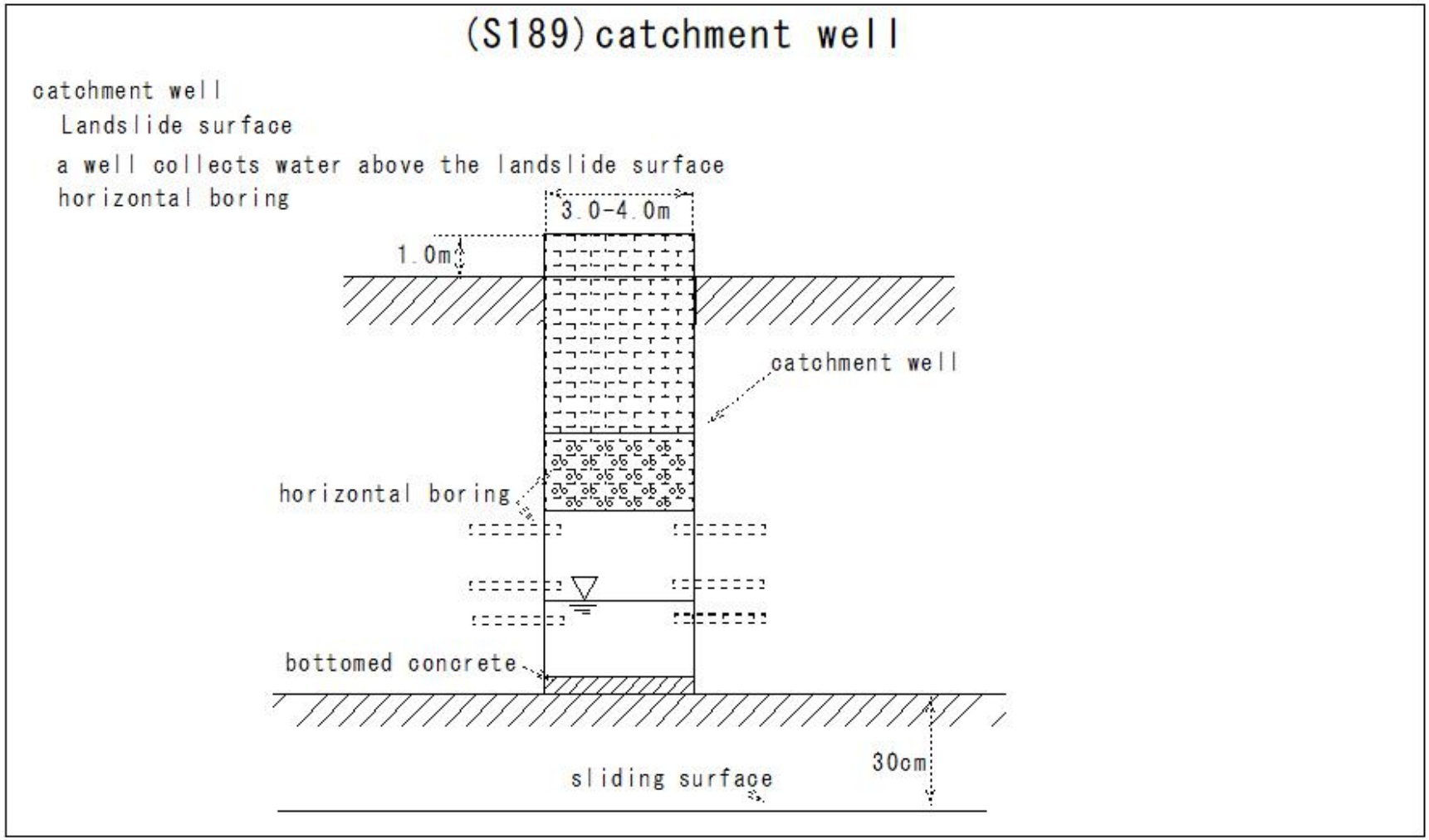
(S187)land slide



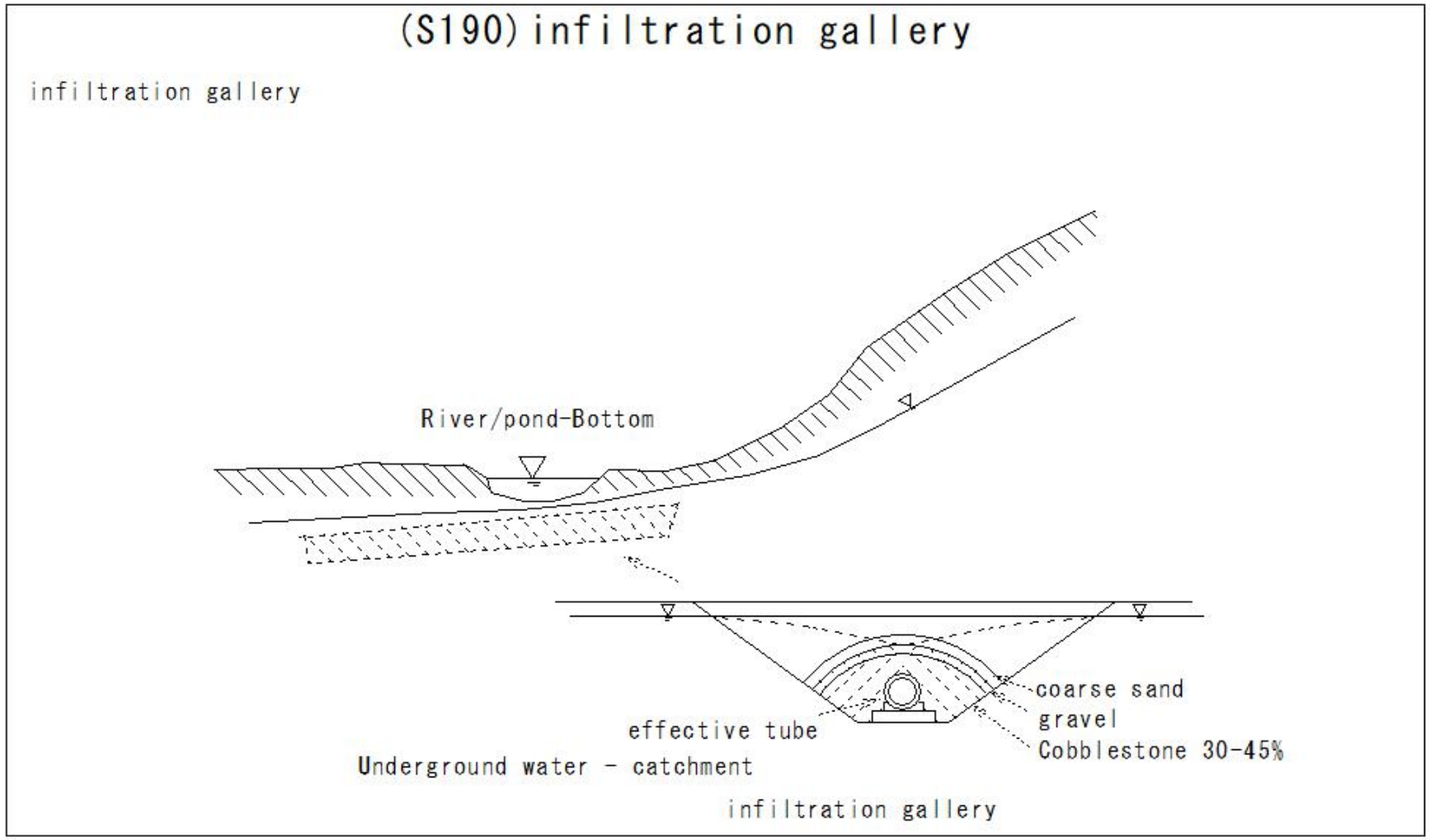
(S188)slope failure



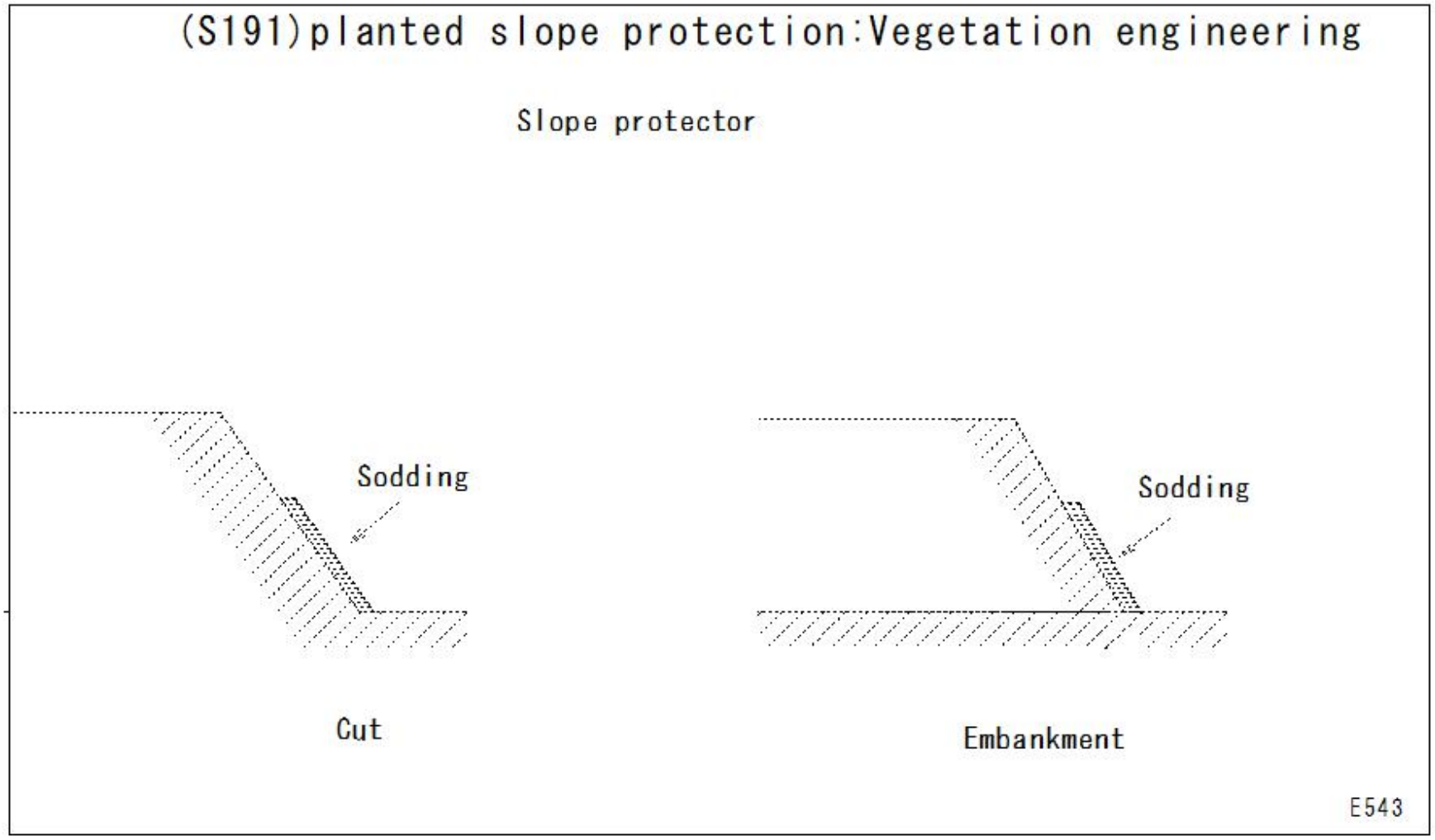
(S189)catchment well



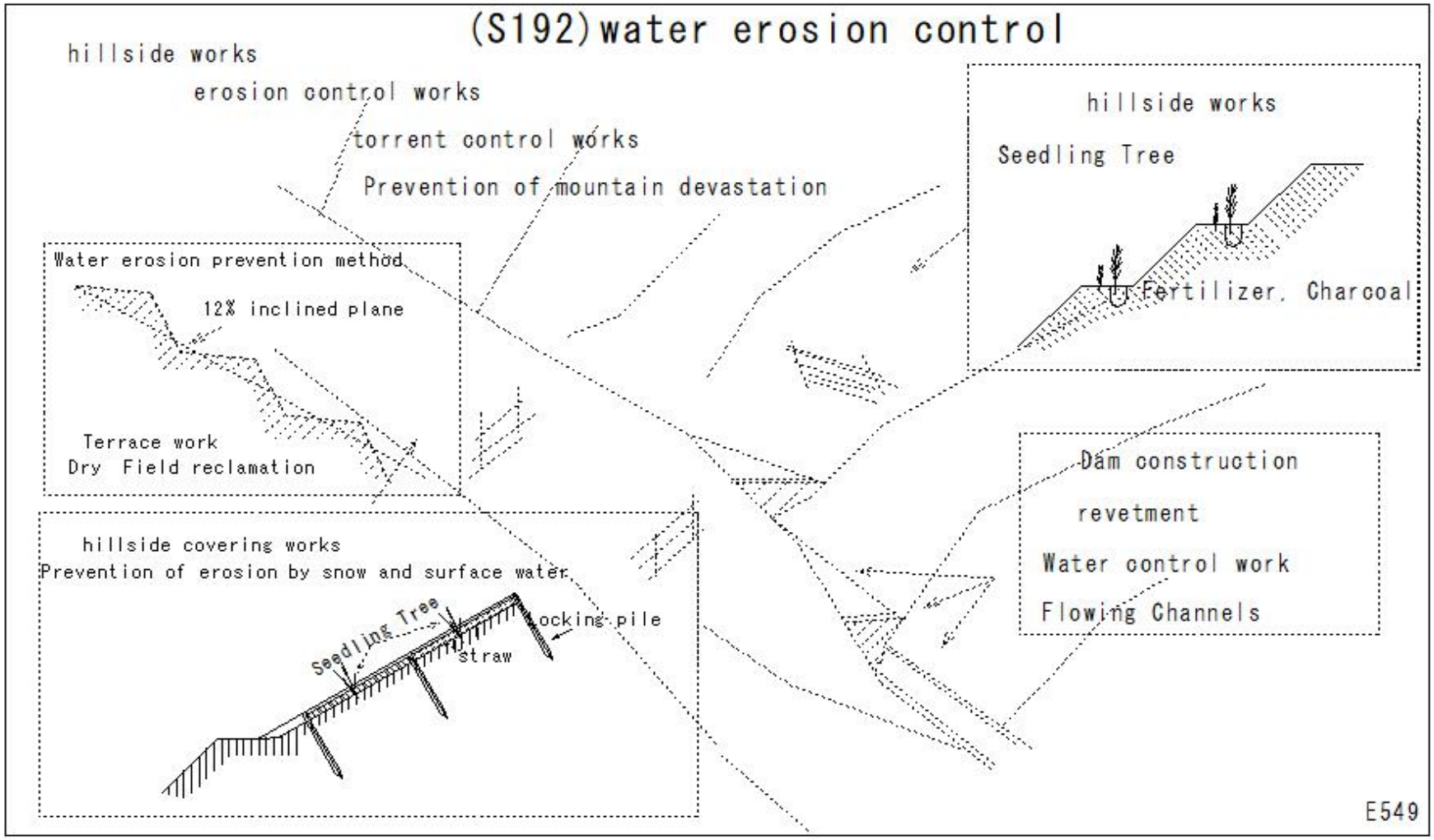
(S190)infiltration gallery



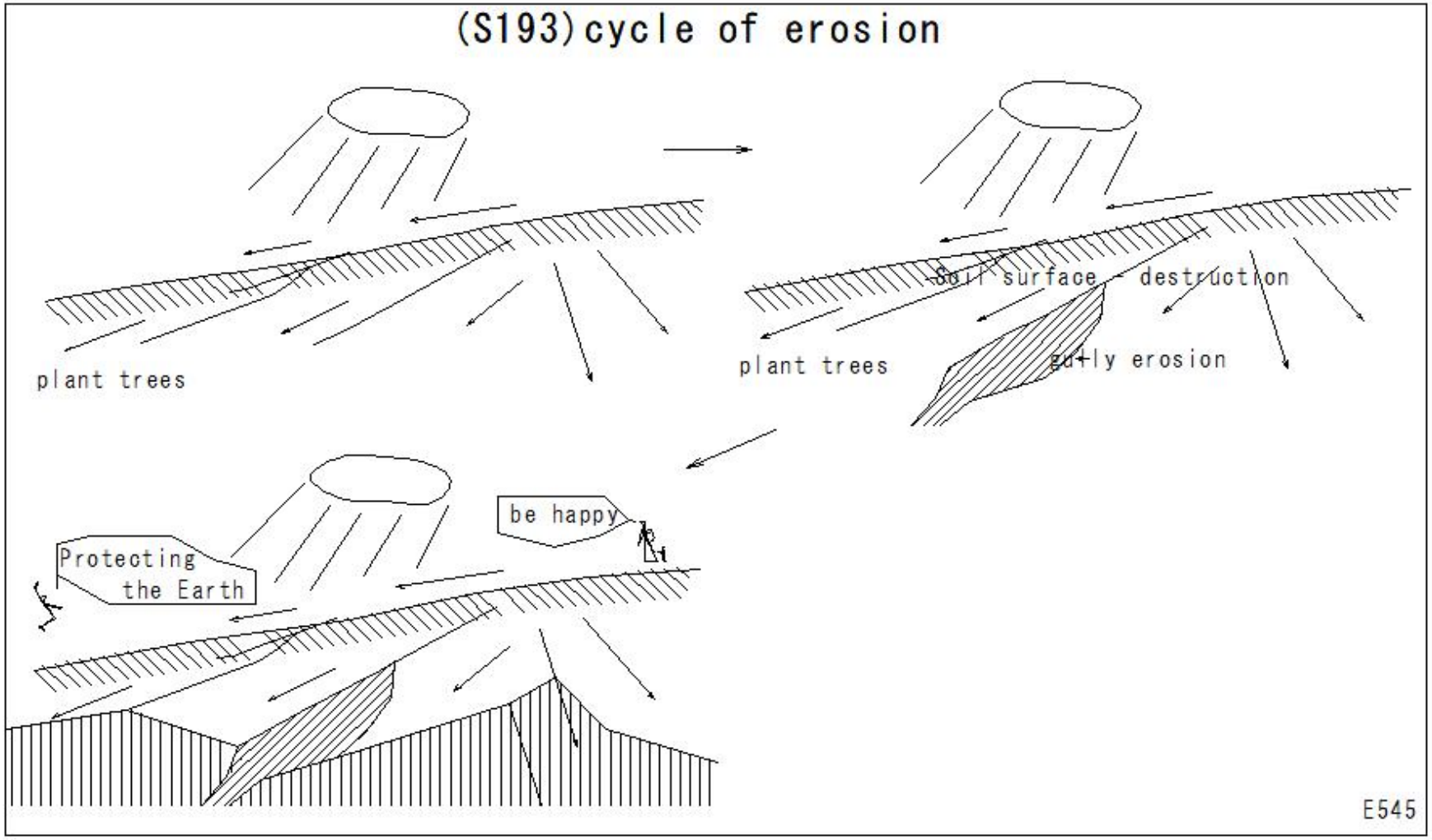
(S191)planted slope protection:Vegetation engineering



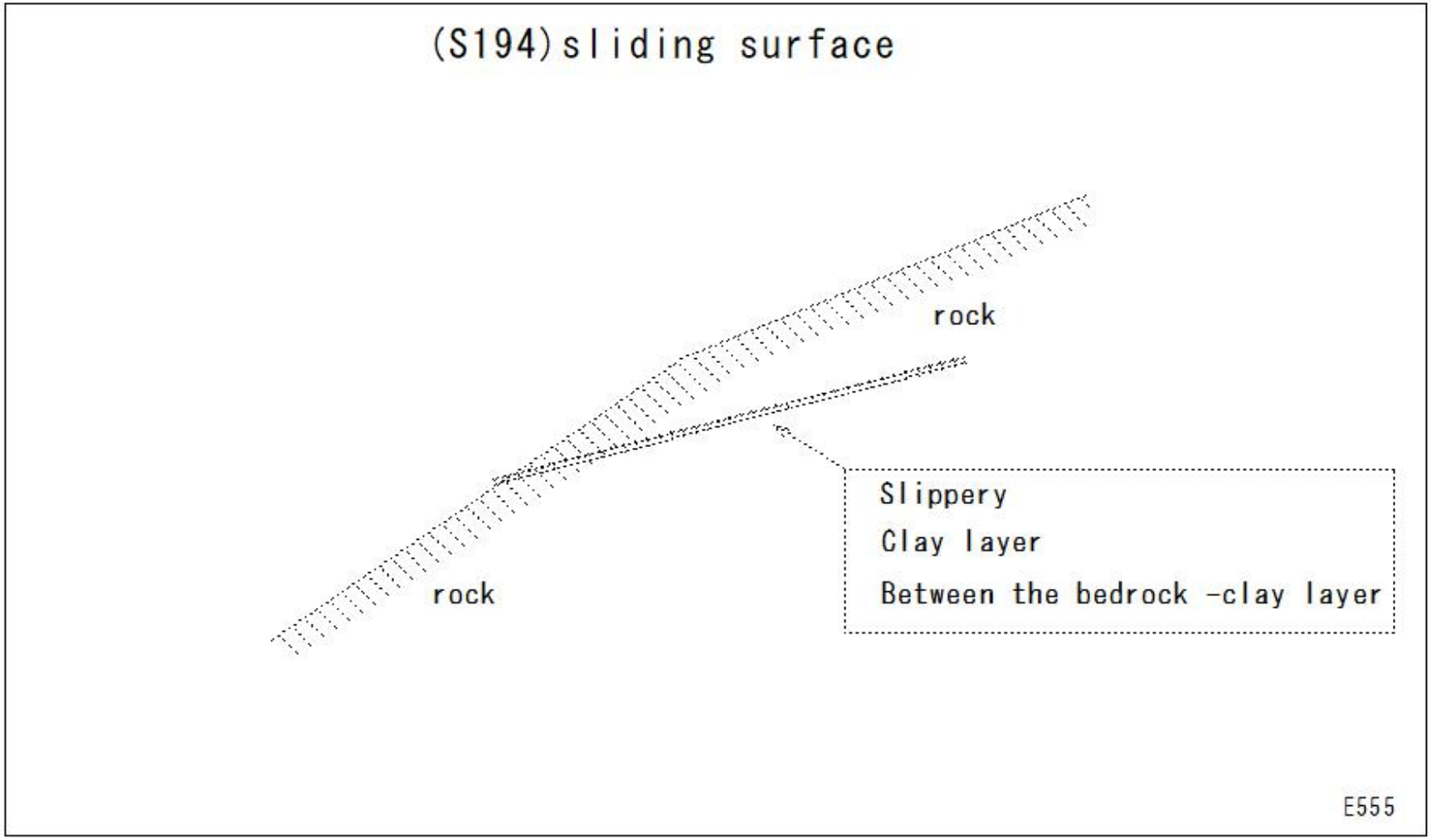
(S192)water erosion control



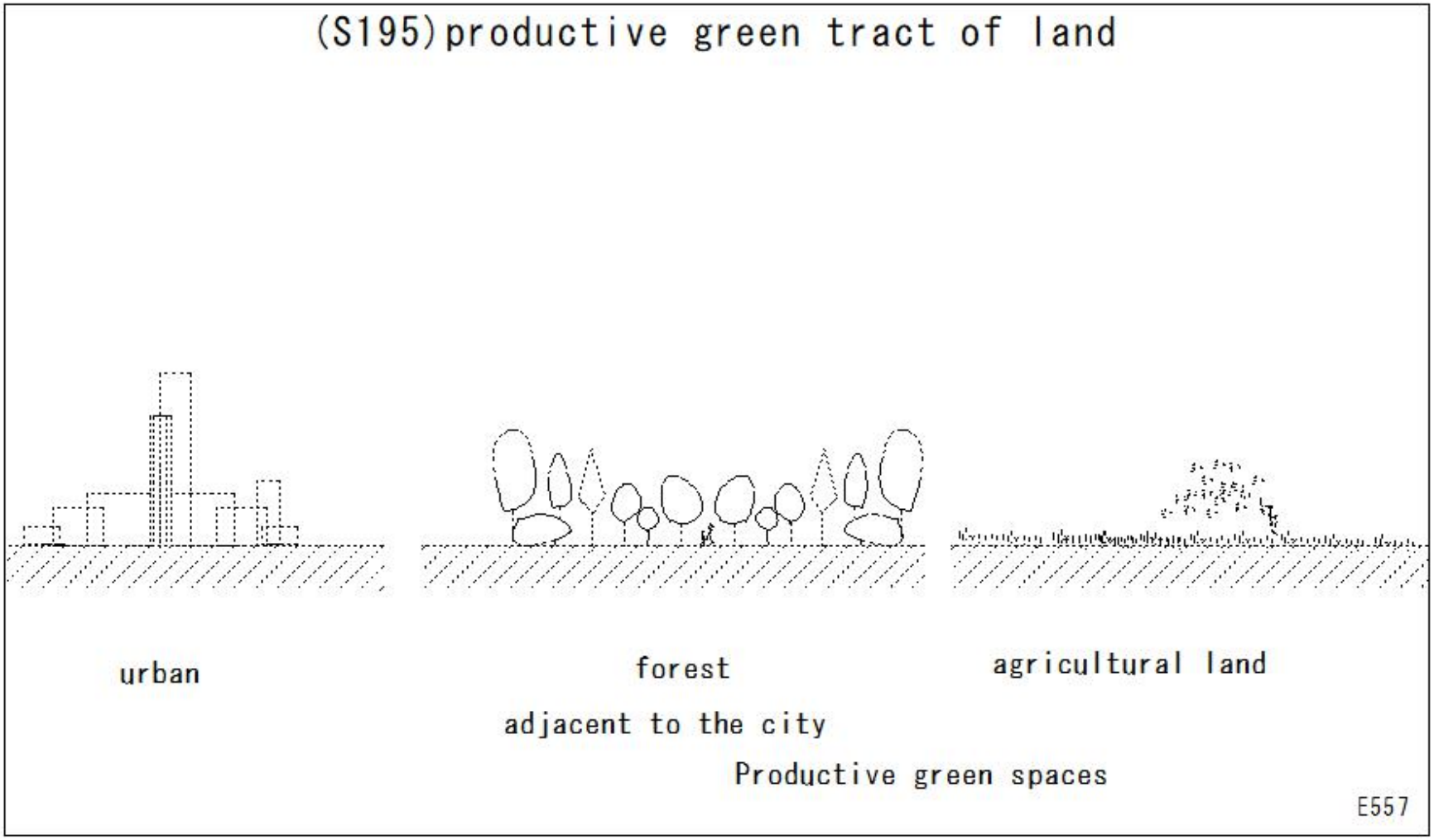
(S193)cycle of erosion



(S194)sliding surface



(S195)productive green tract of land



(S196)traction

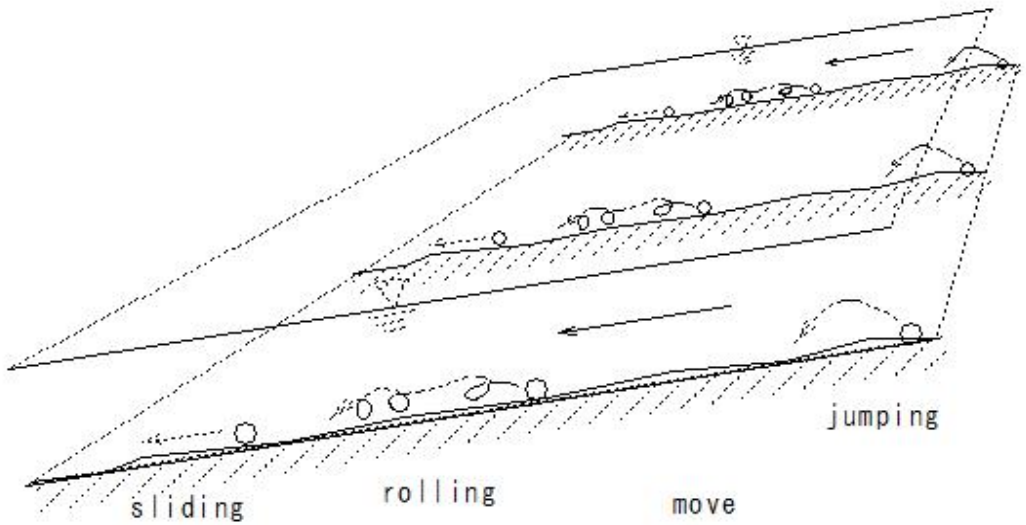
(S196)traction

traction: Flowing by rolling on the river bed

Sediment on the riverbed is Scouring

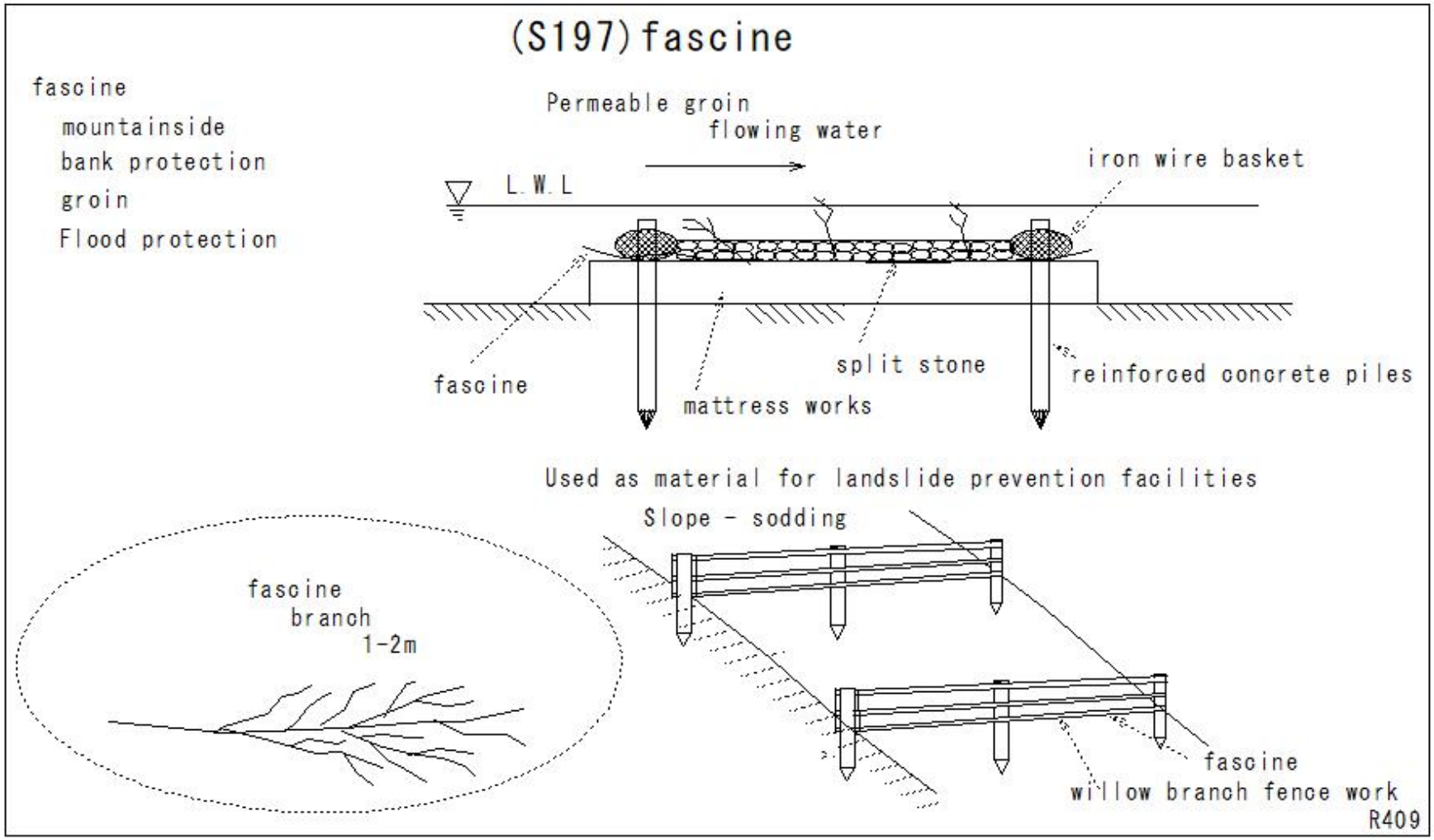
flow out

Sediment on the river bed

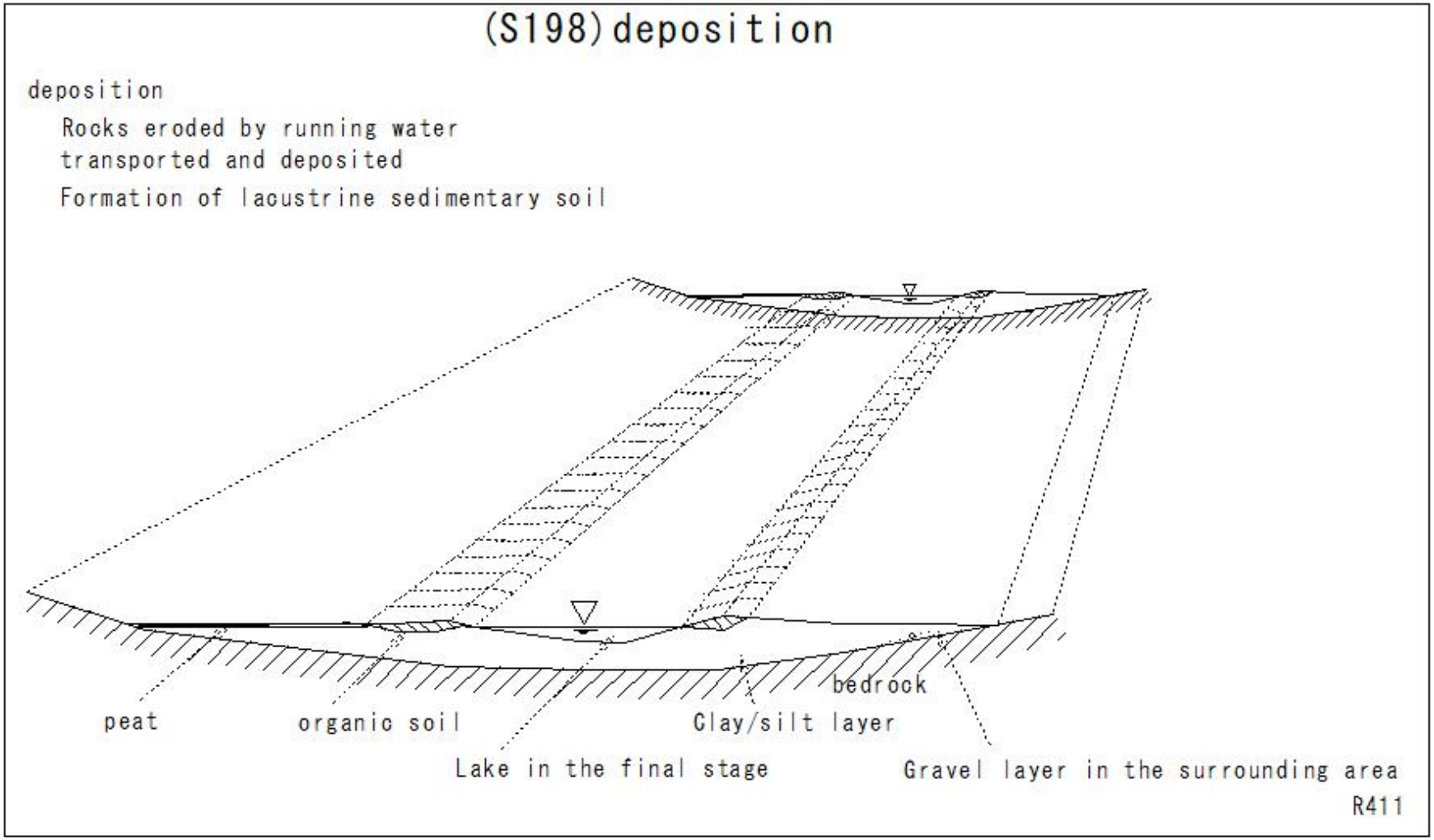


R407

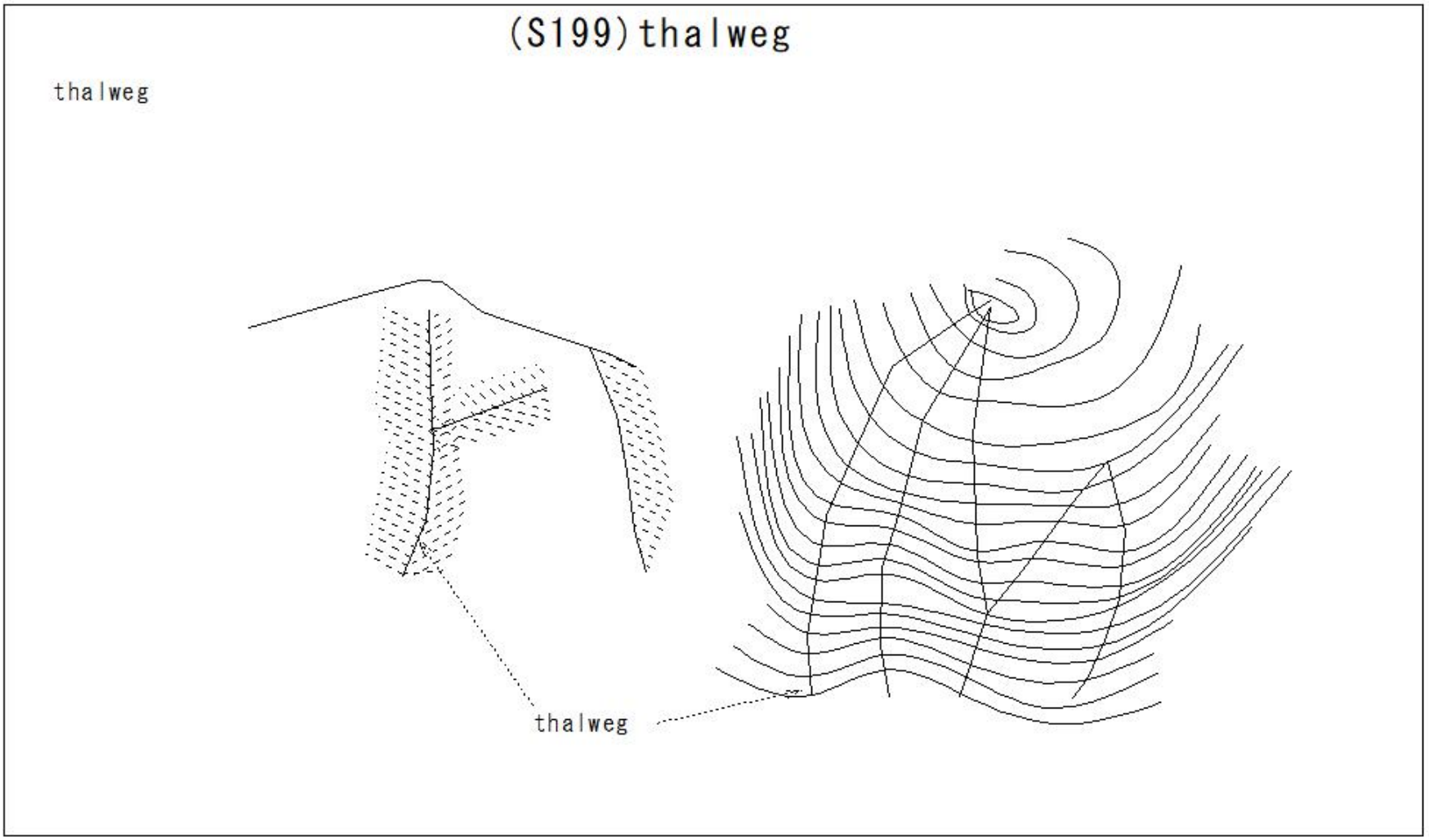
(S197)fascine



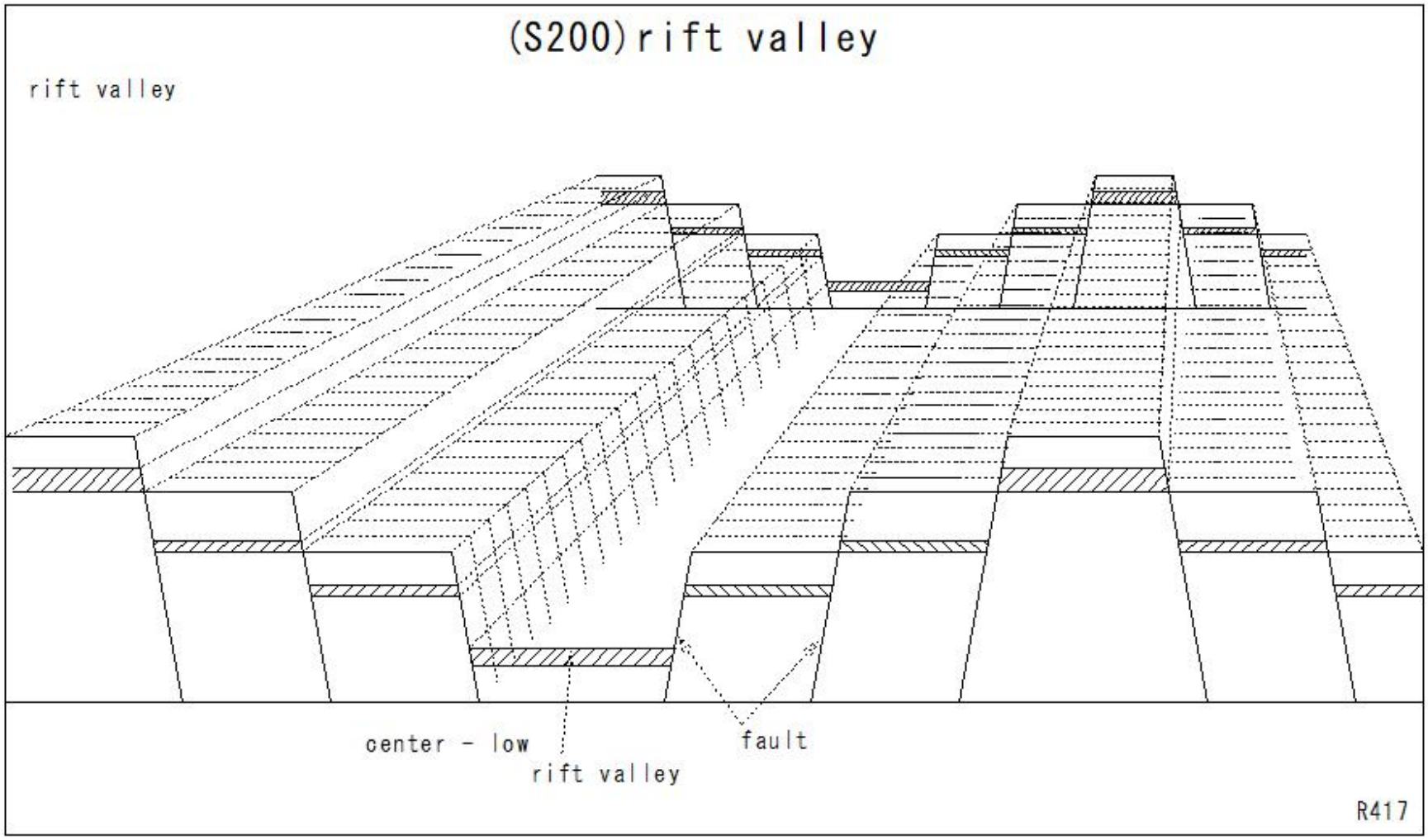
(S198)deposition



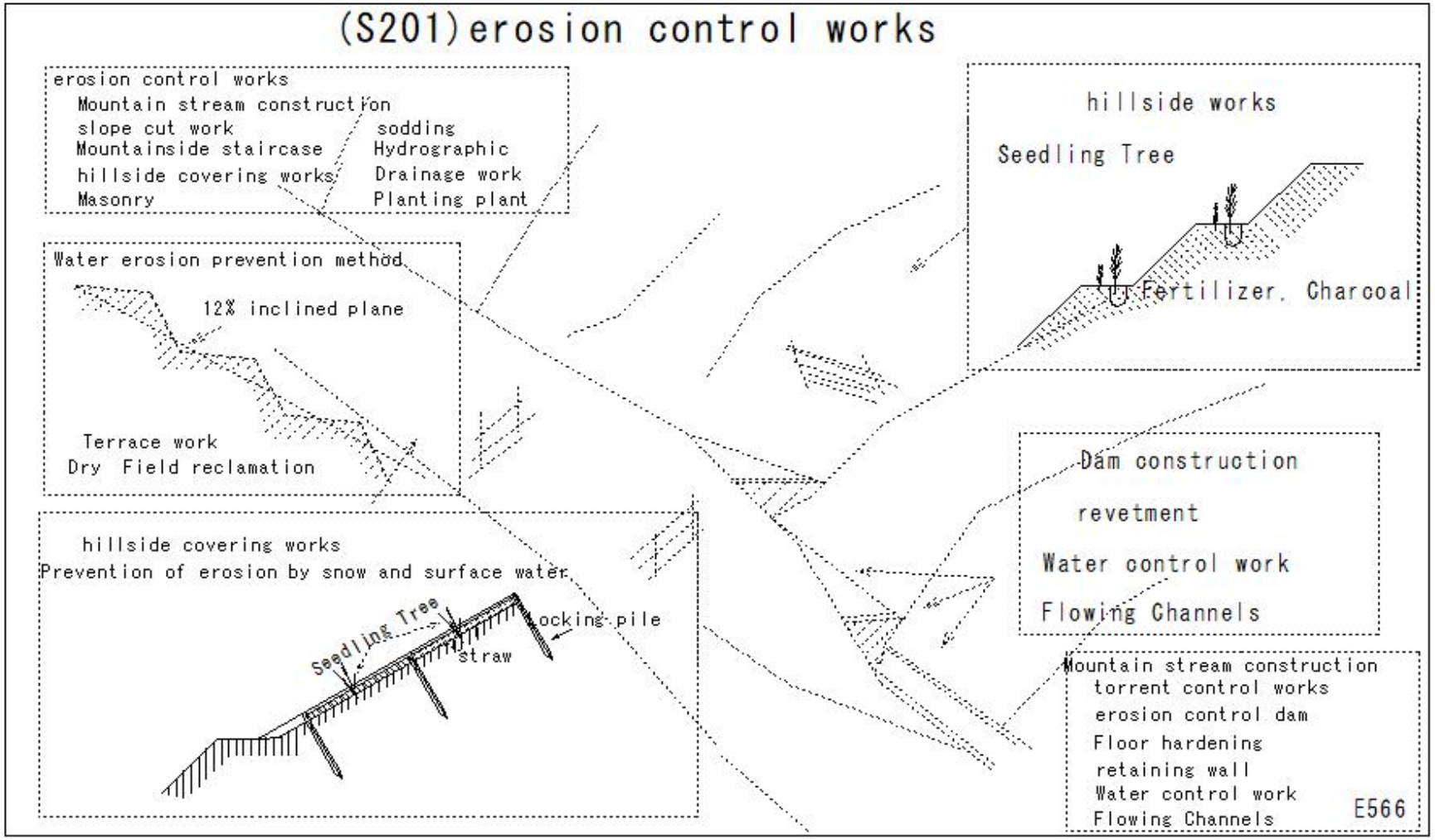
(S199)thalweg



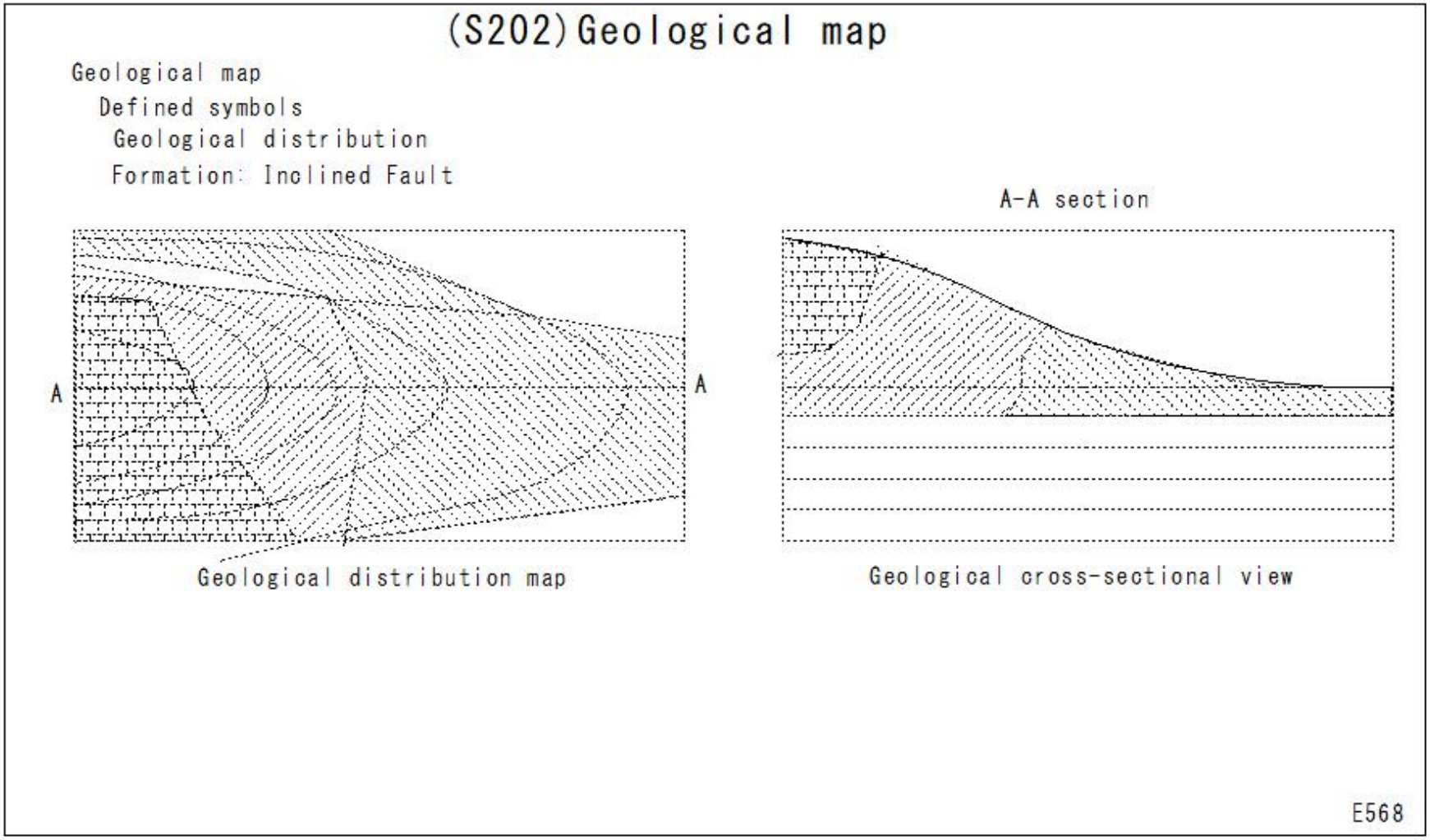
(S200)rift valley



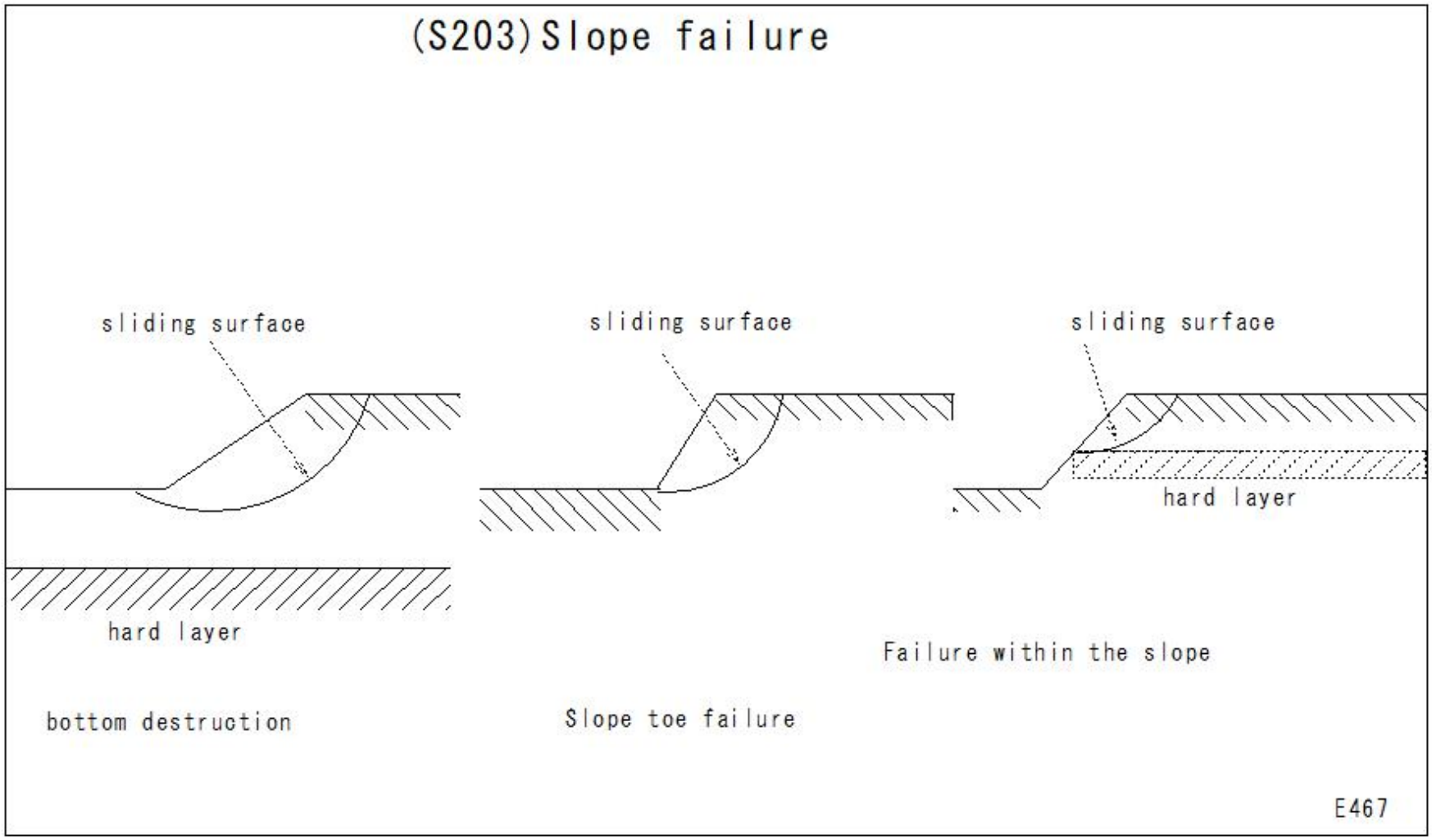
(S201)erosion control works



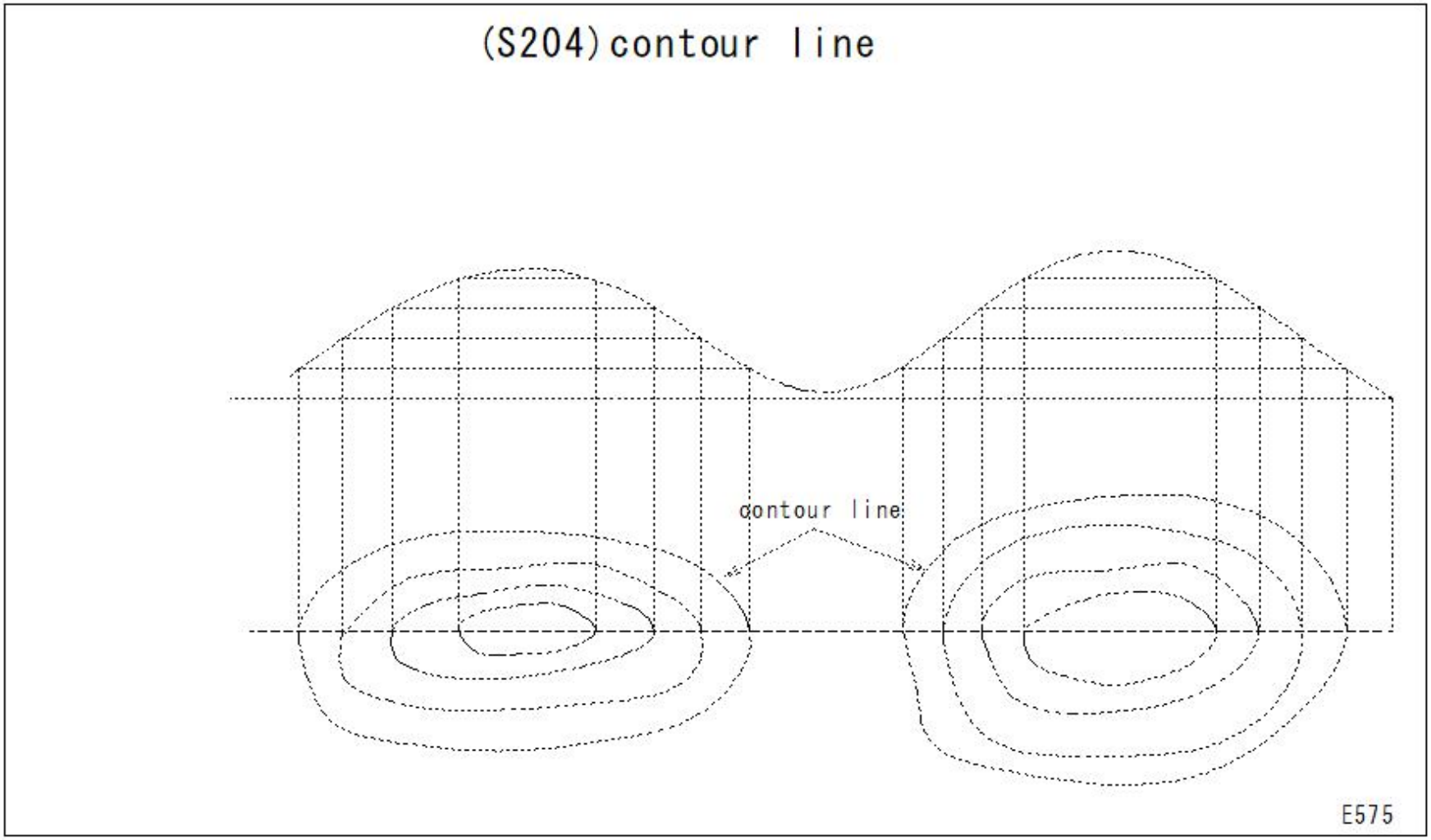
(S202)Geological map



(S203)base failure



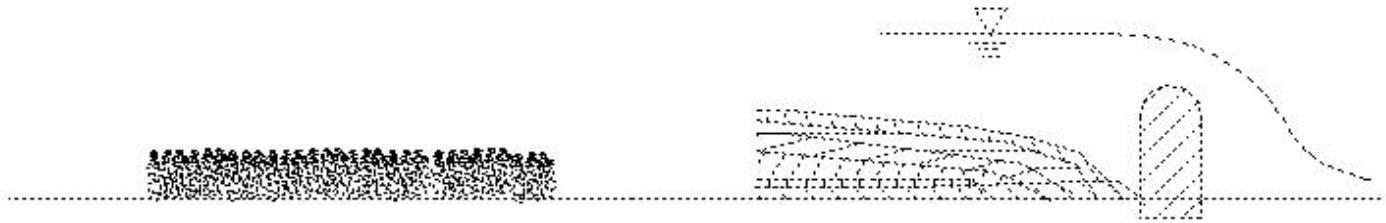
(S204)contour line



(S205)sediment settling

(S205)sediment settling

sediment settling
- Water flow
- Stationary soil pressure
- Sediment in water - precipitation

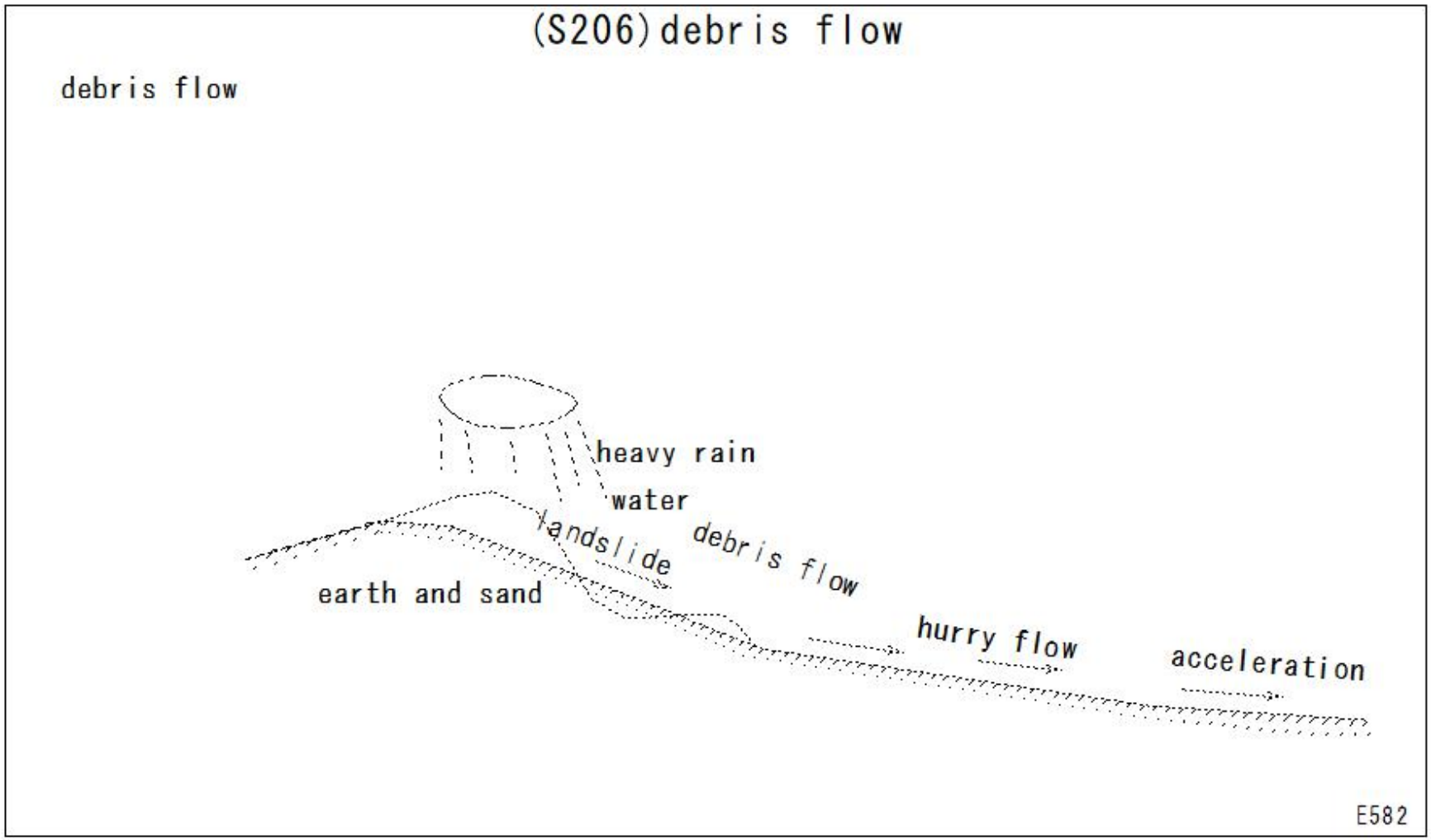


Precipitation in still water
The lower layer has a larger particle size

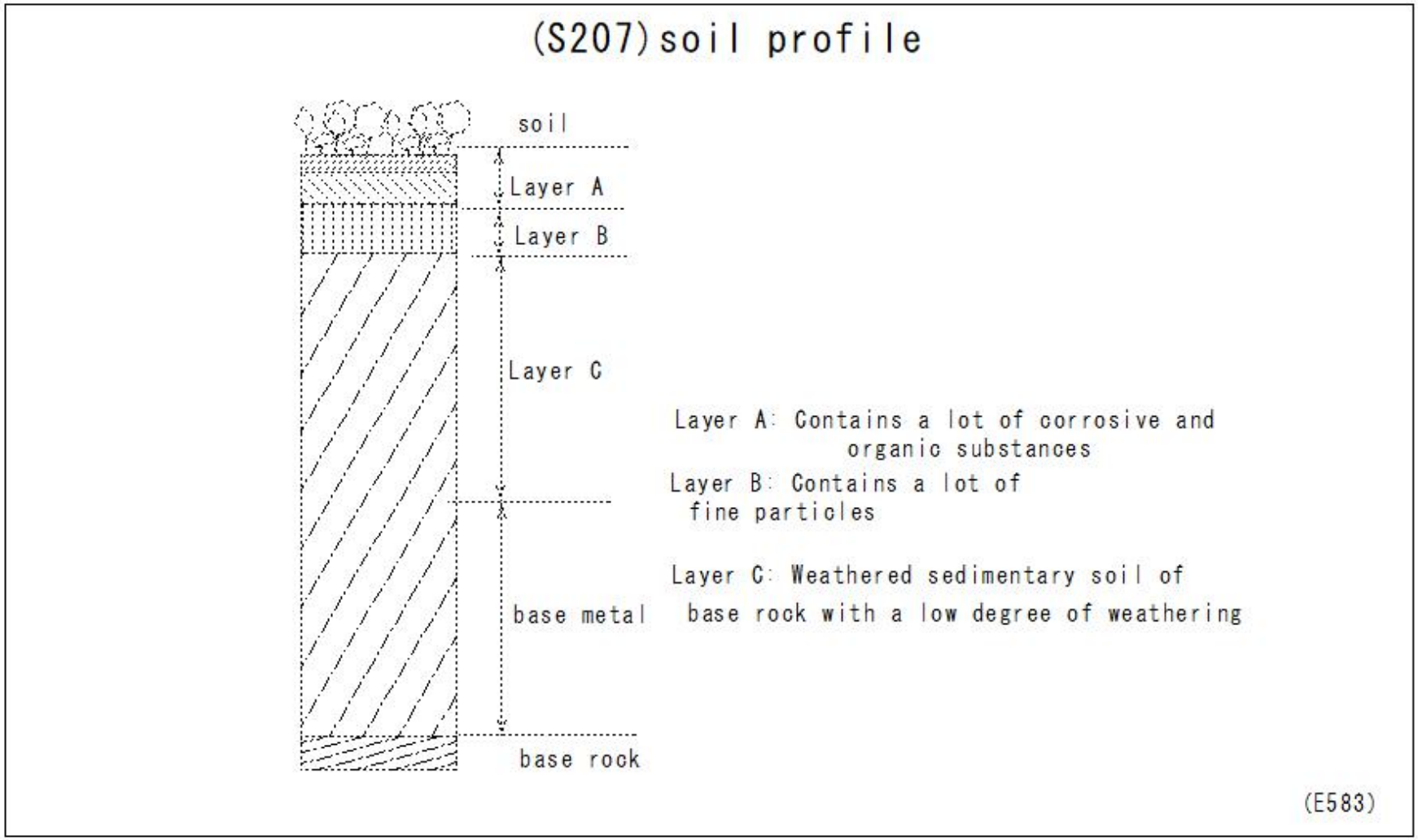
The tip is attached to the dam
Deposition

E580

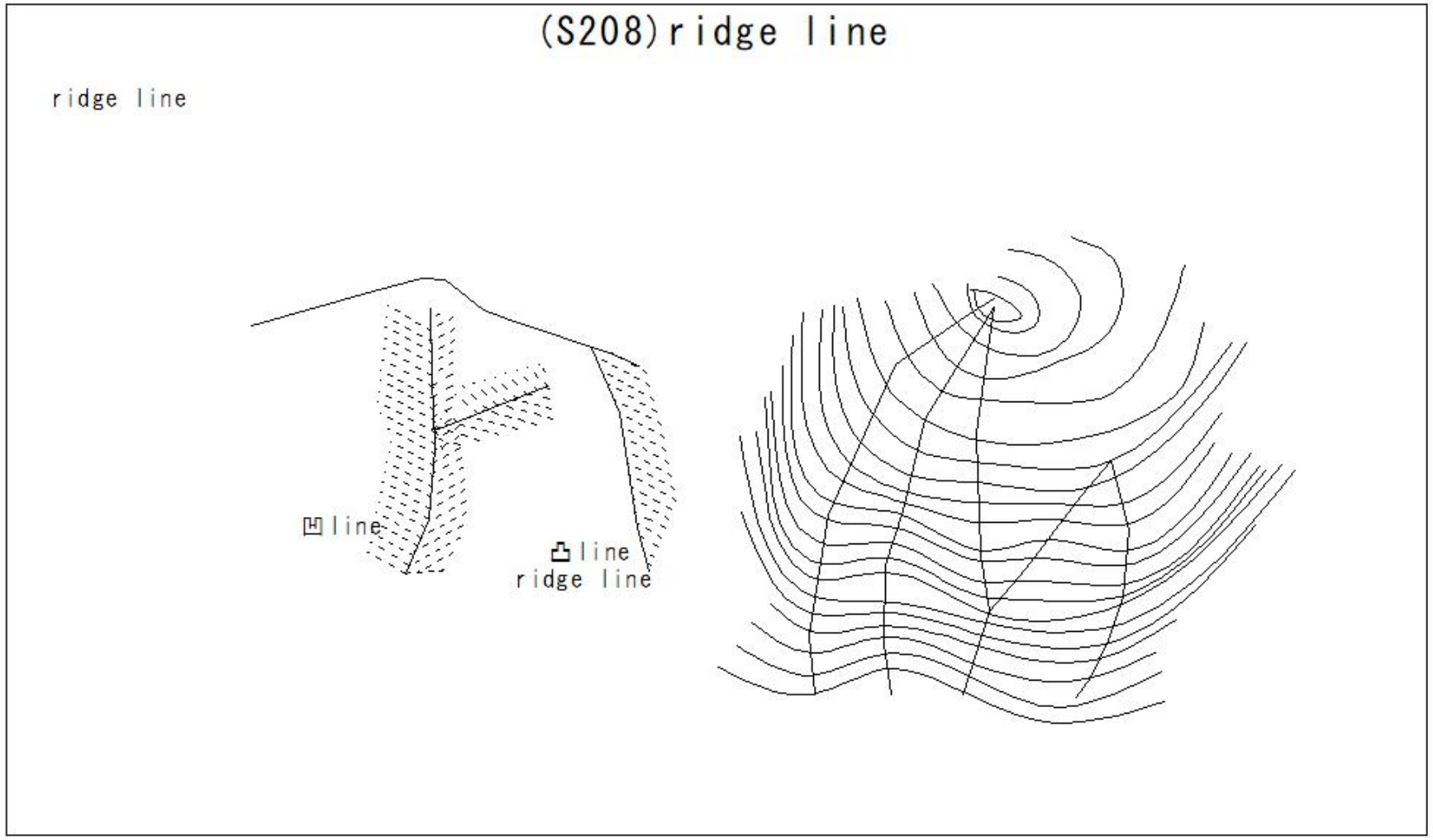
(S206)debris flow



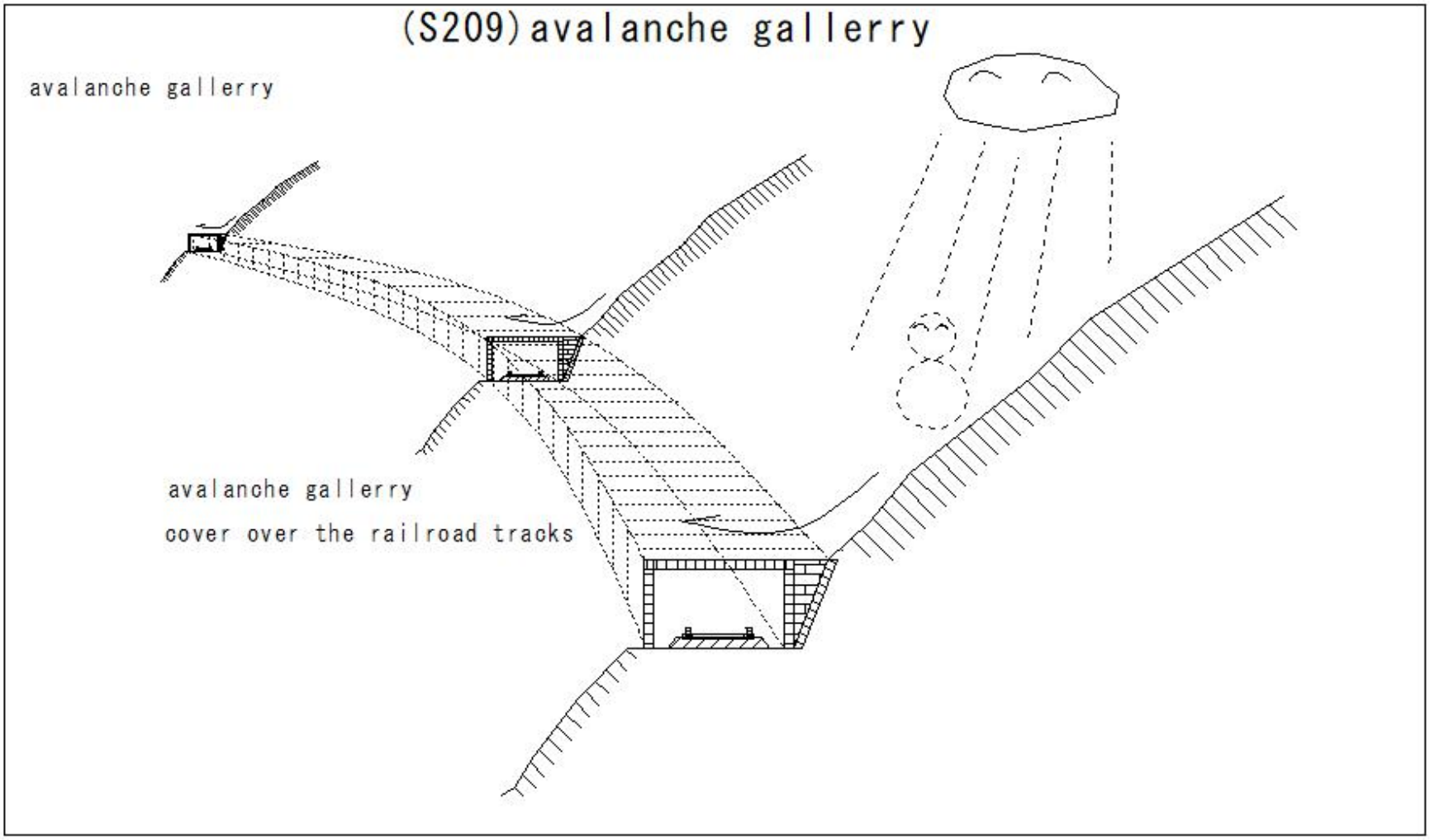
(S207)soil profile



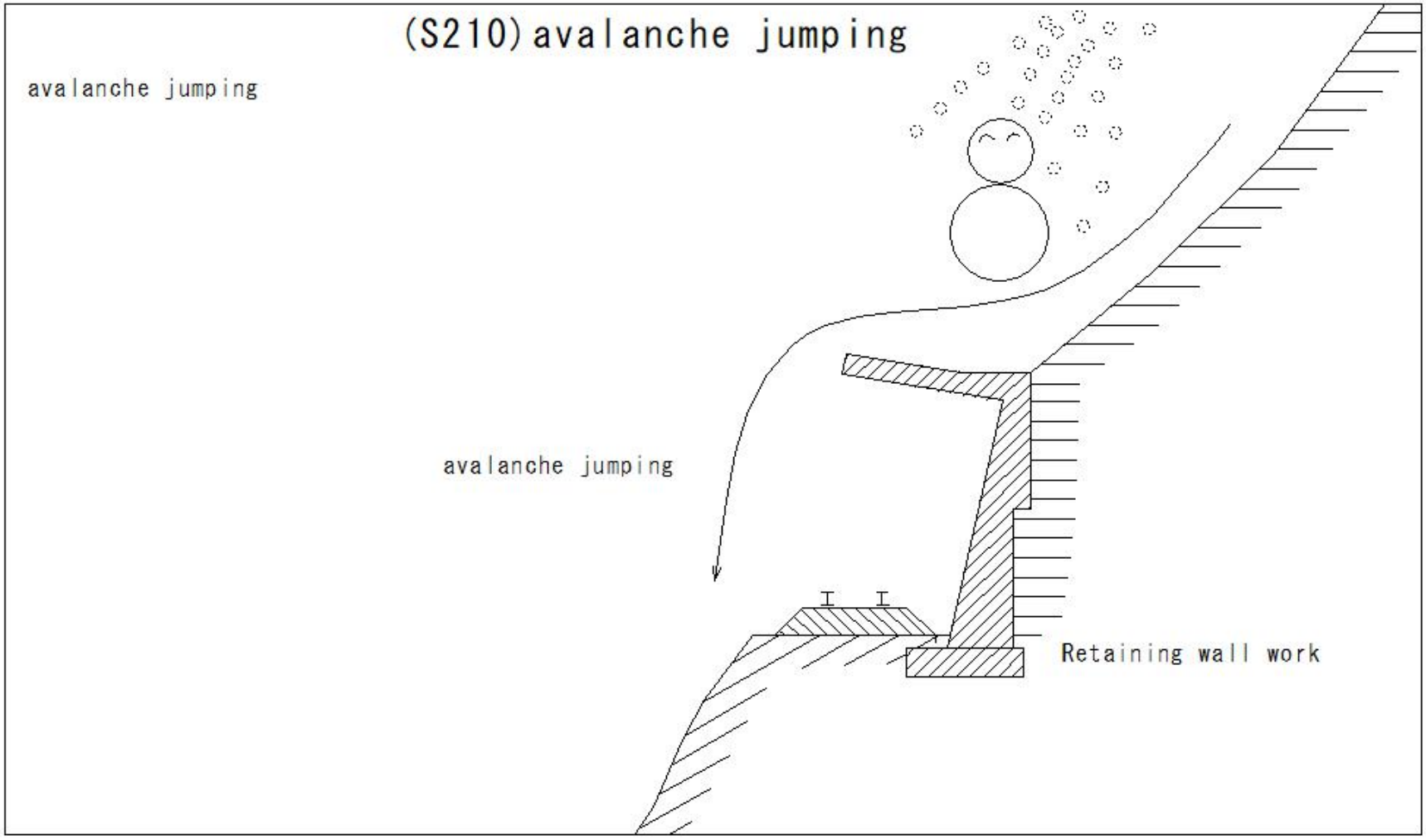
(S208)ridge line



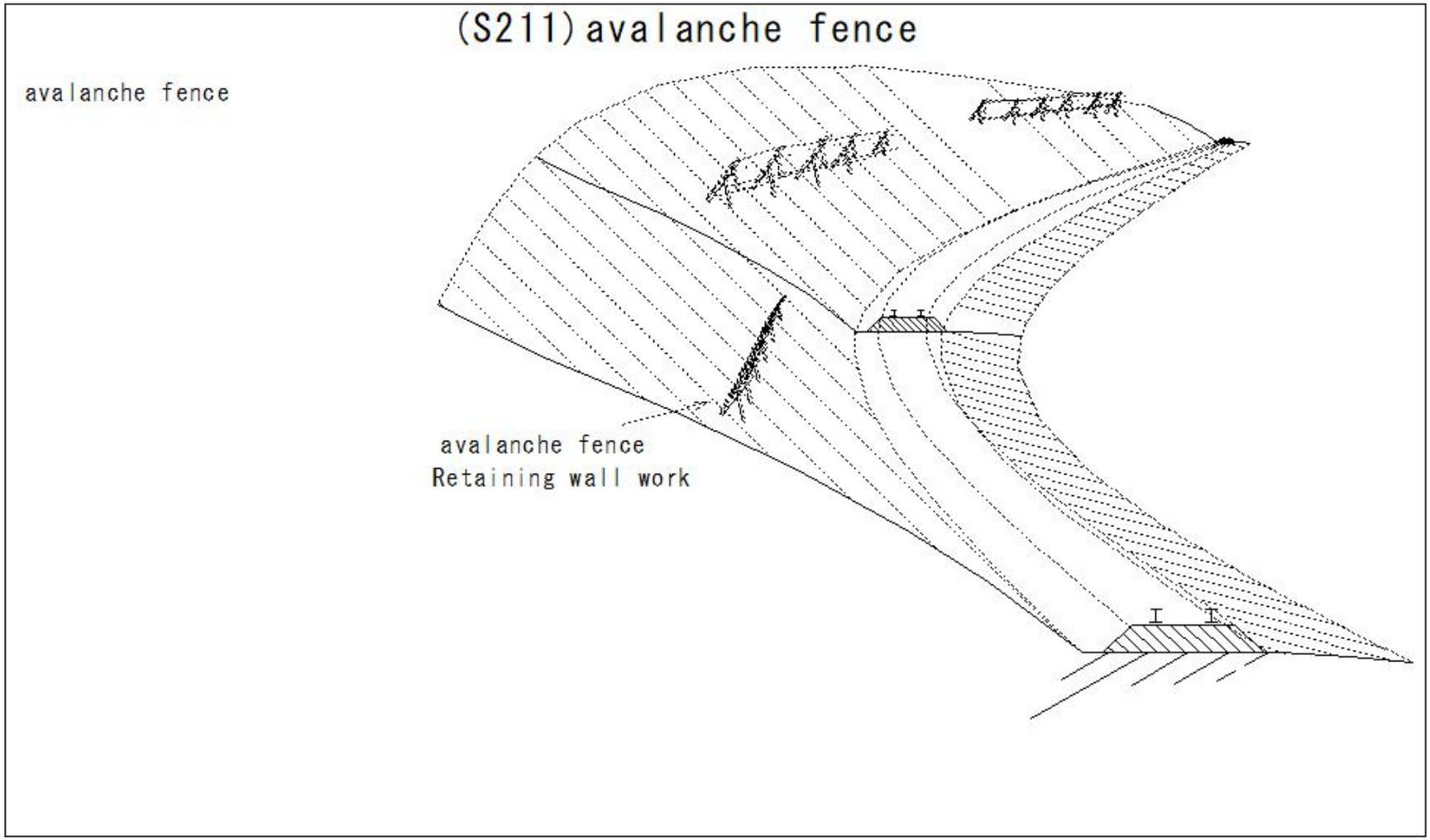
(S209)avalanche gallerry



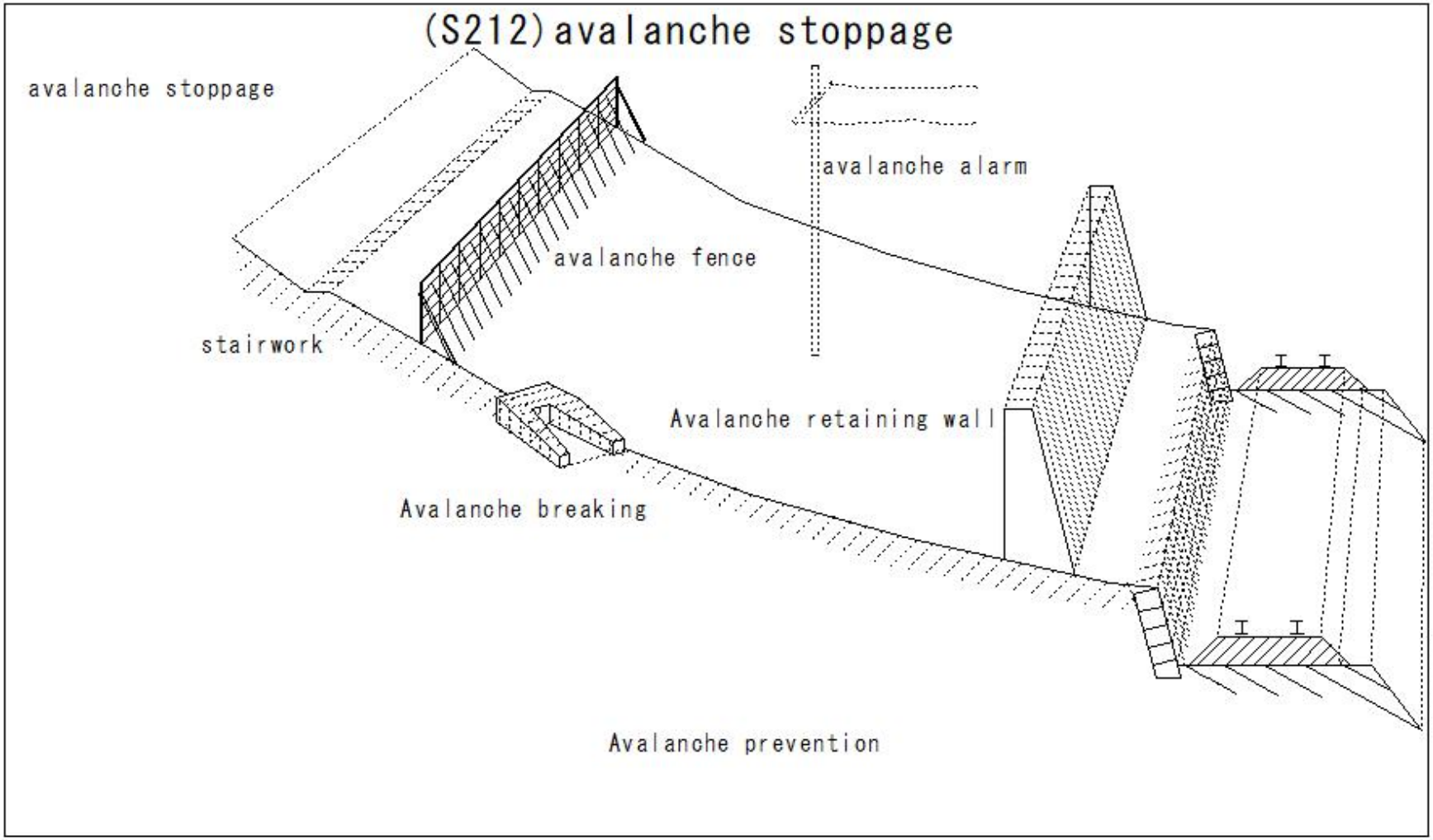
(S210)avalanche jumping



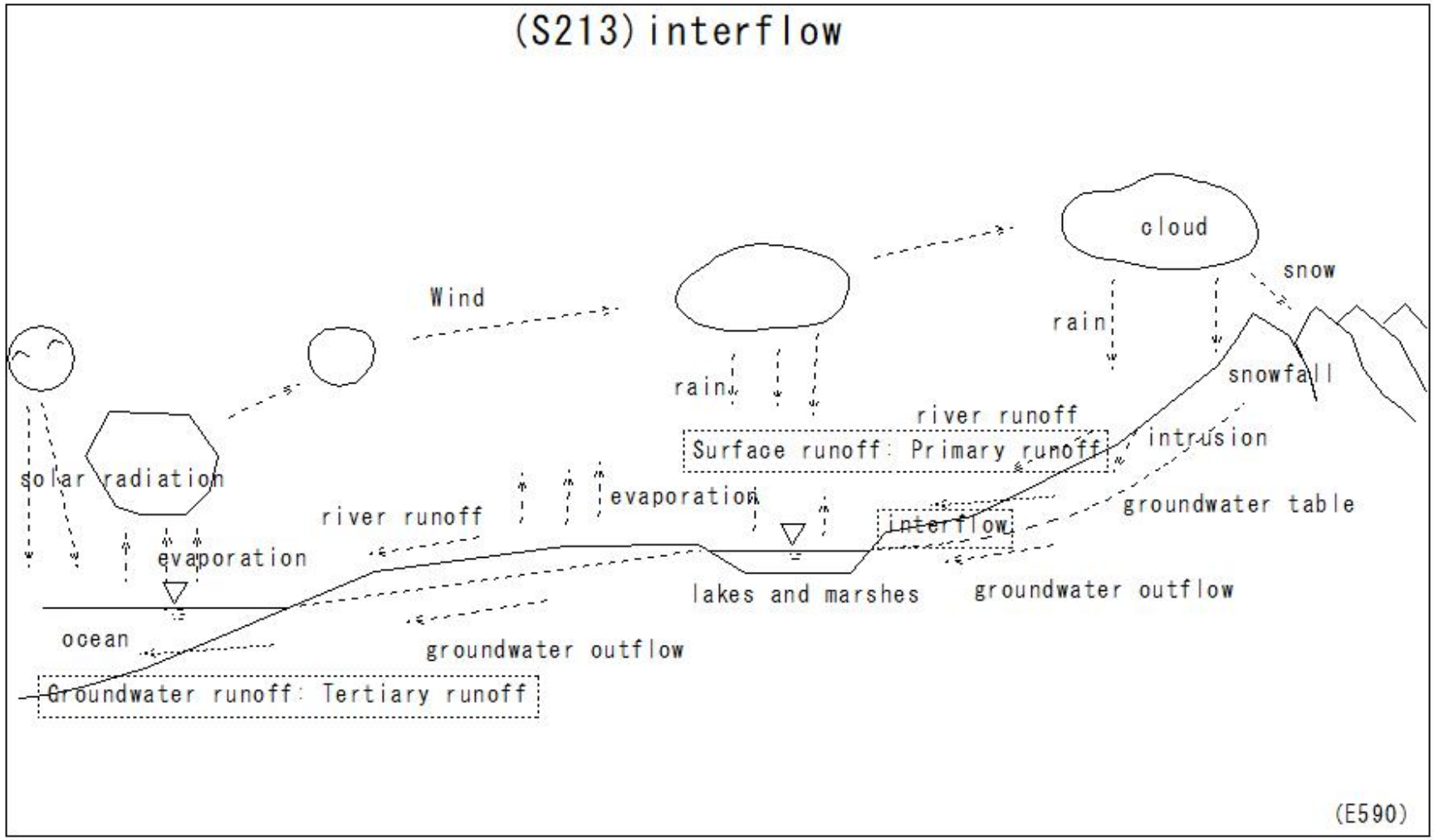
(S211)avalanche fence



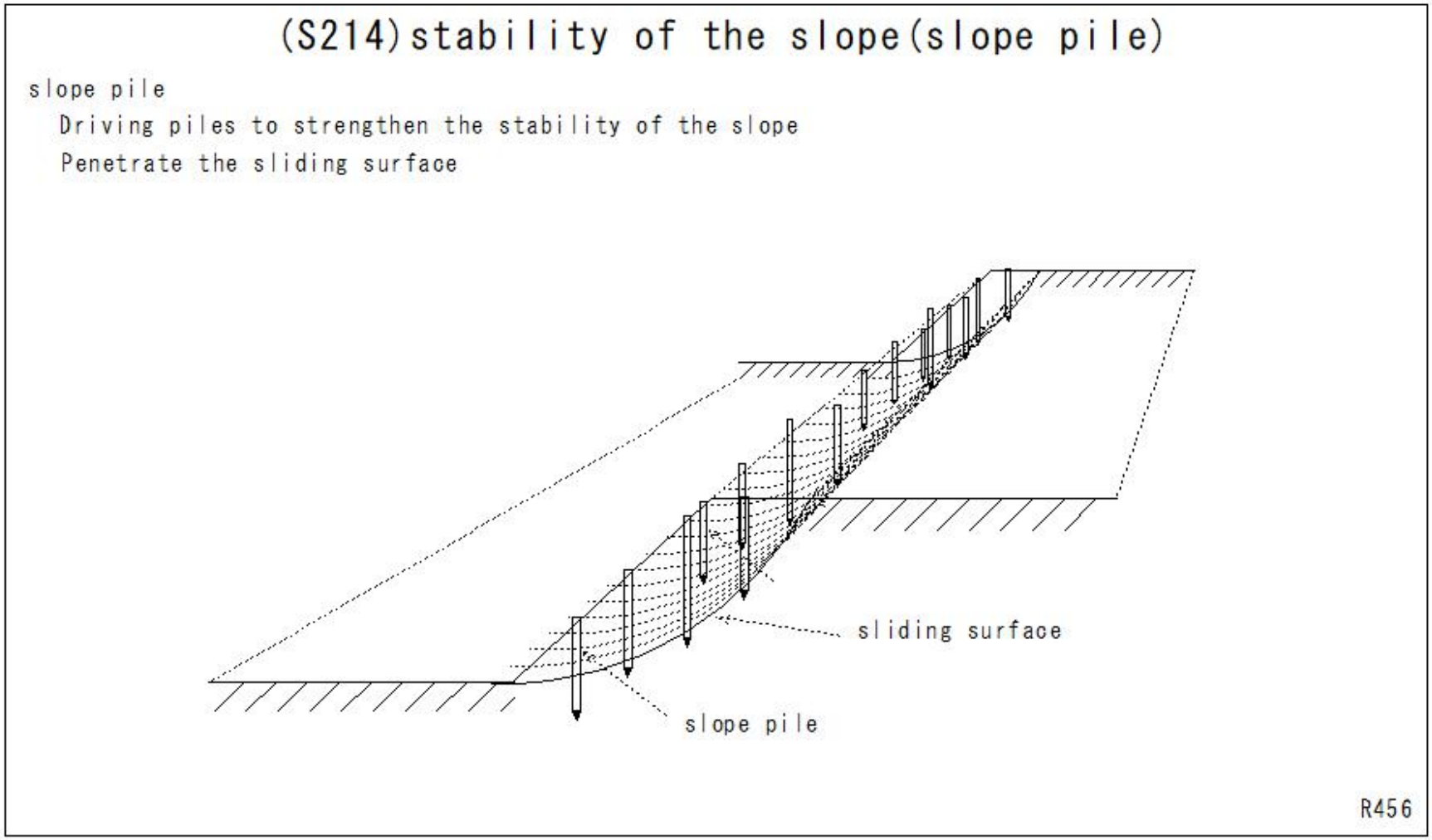
(S212)avalanche stoppage



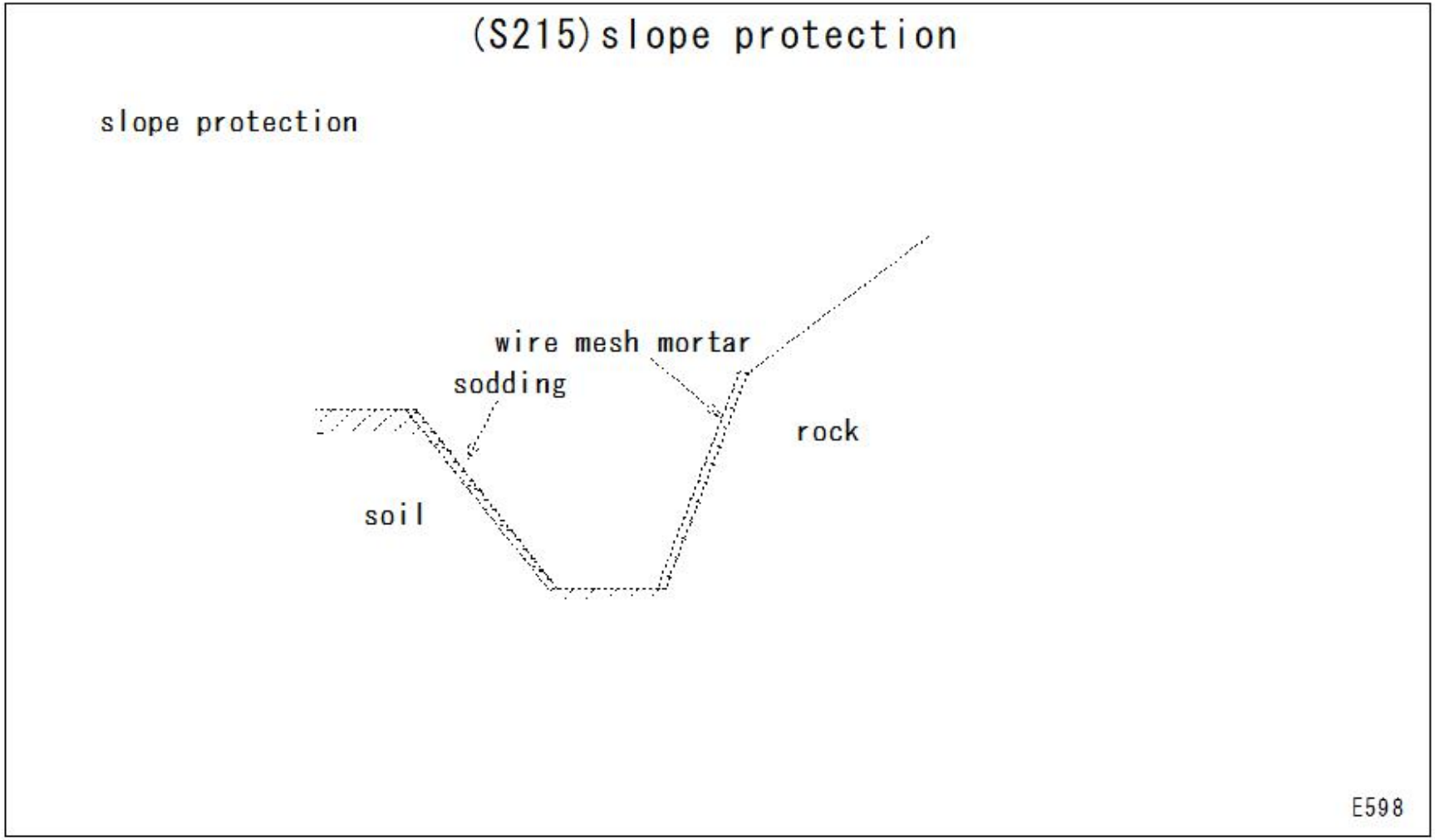
(S213)interflow



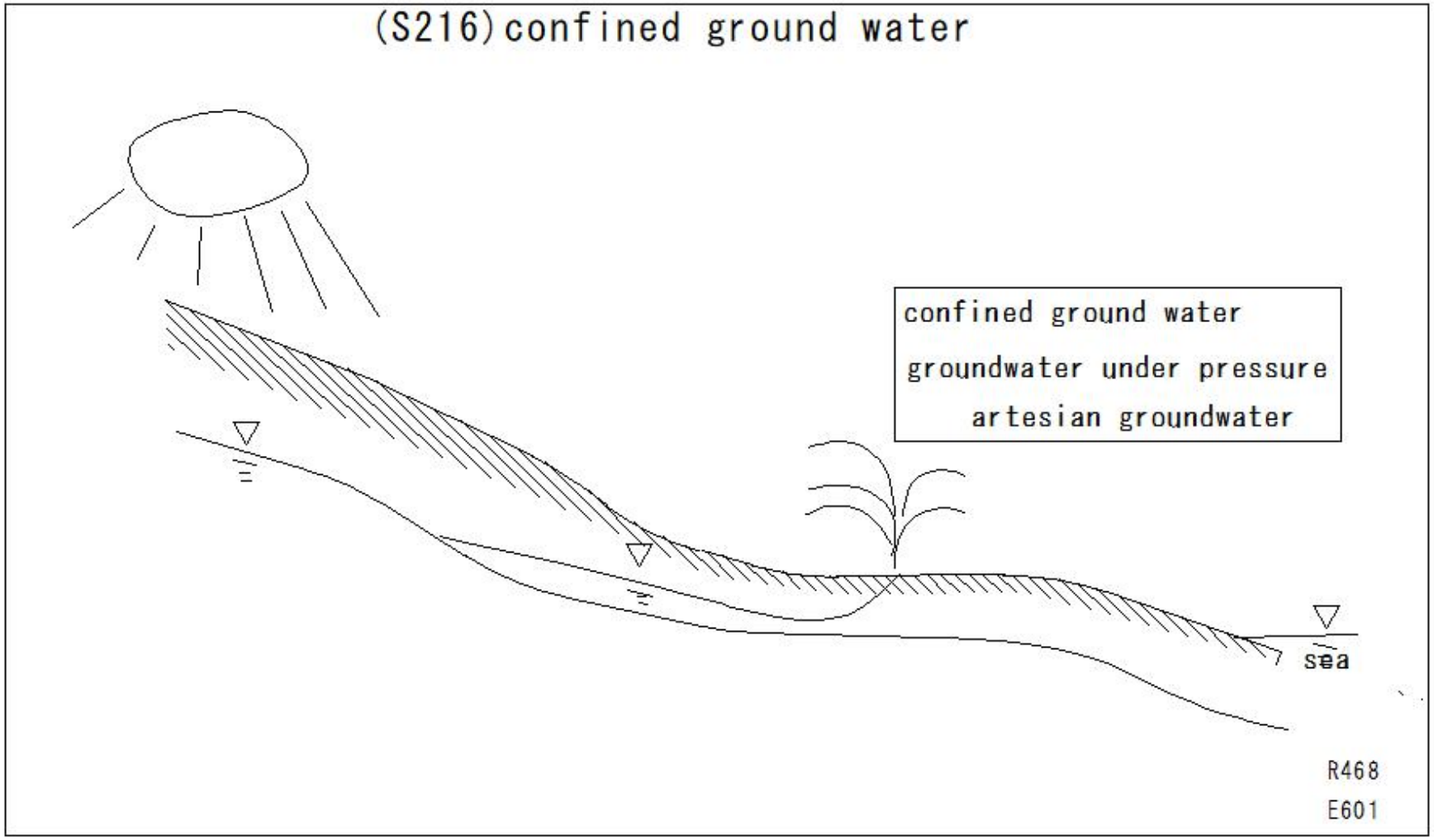
(S214)stability of the slope(slope pile)



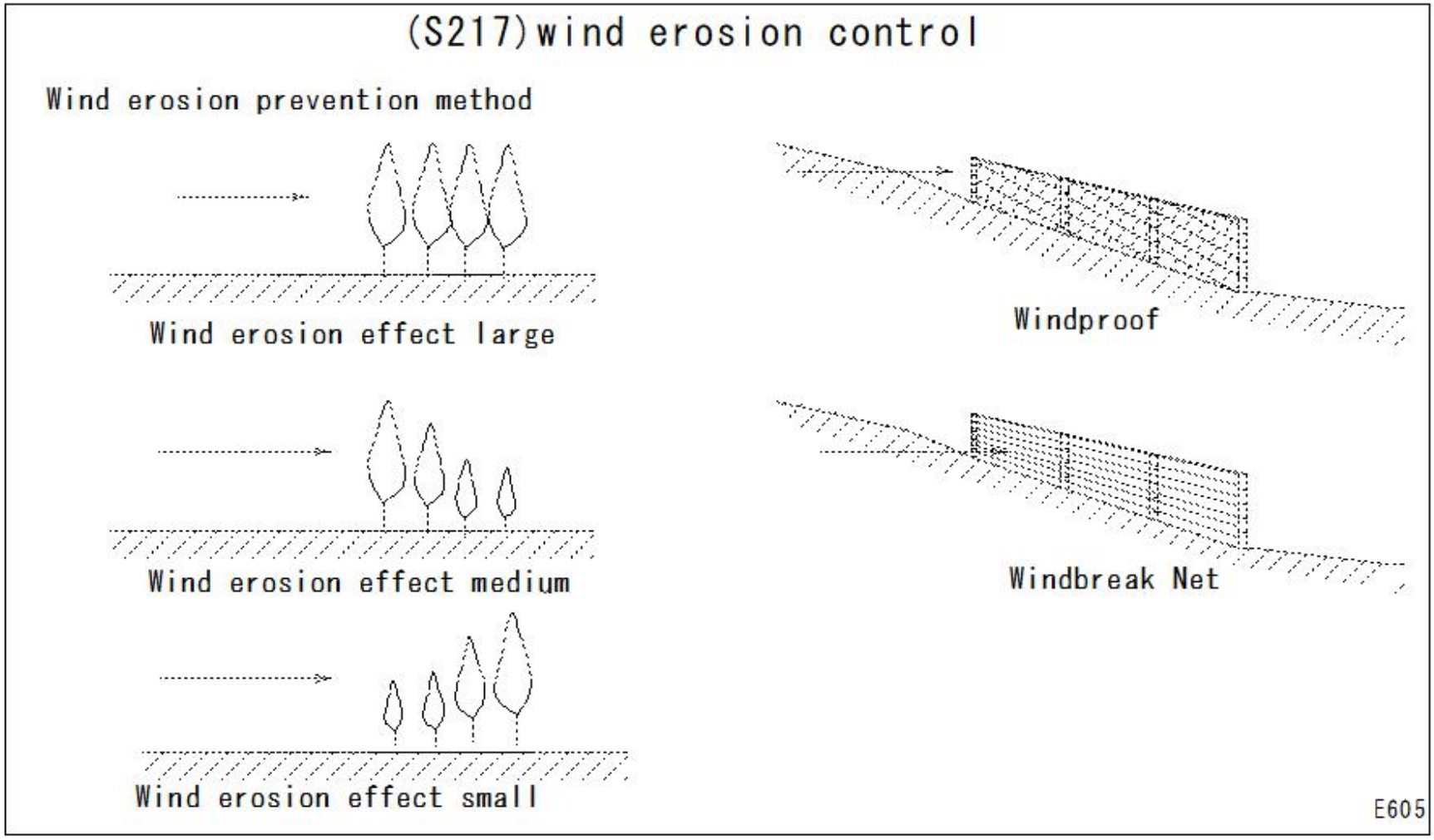
(S215)slope protection



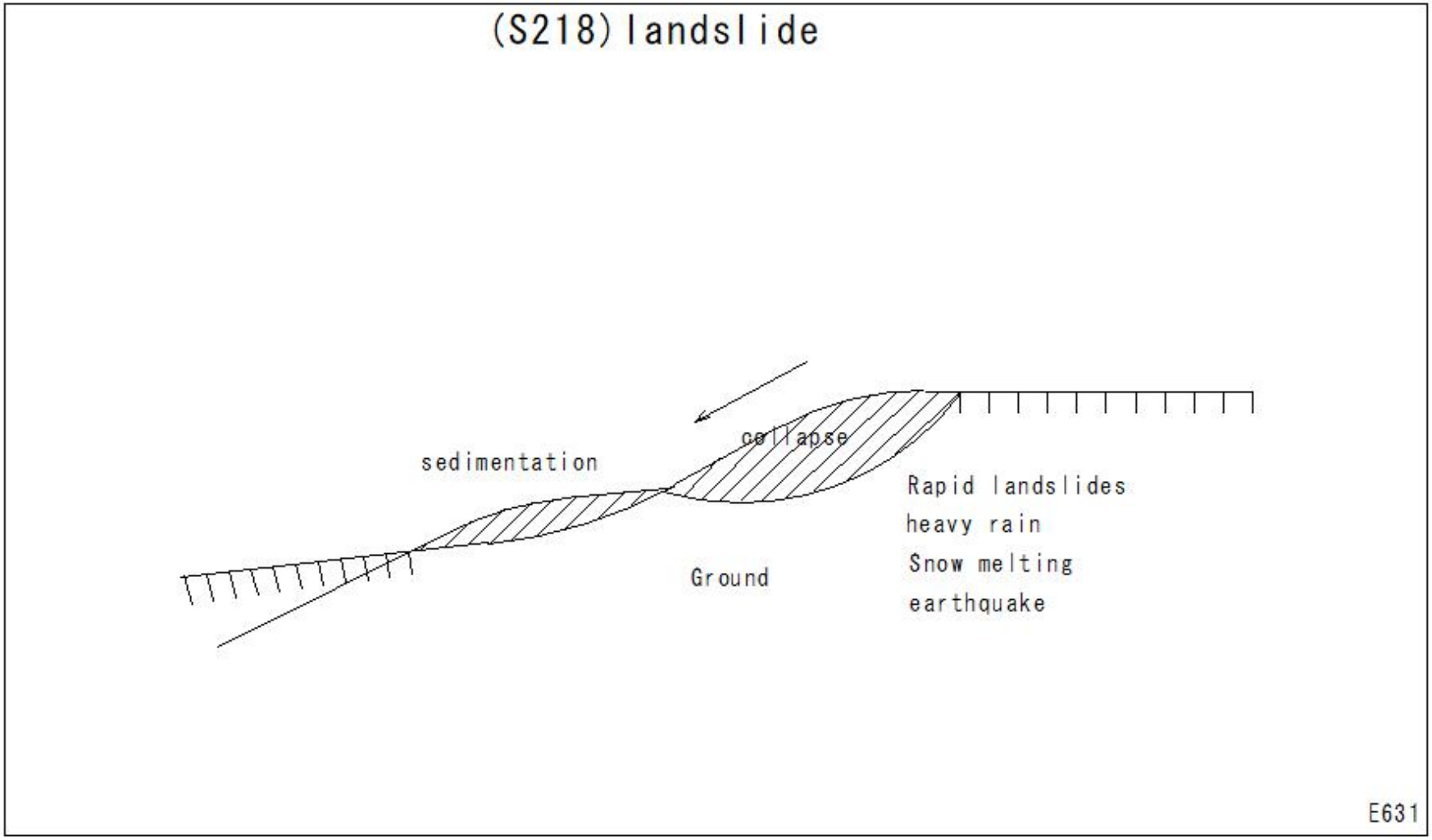
(S216)confined ground water



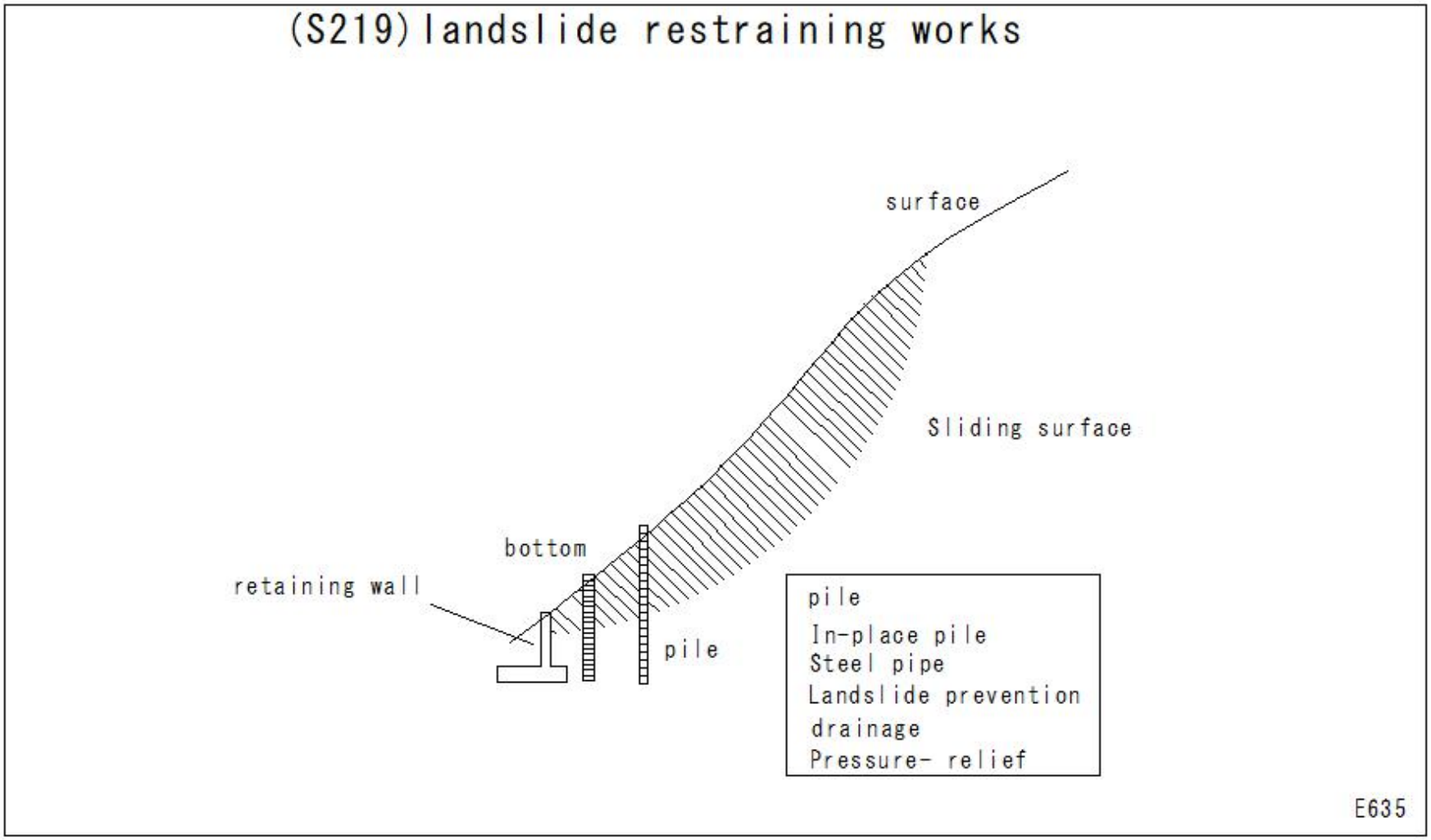
(S217)wind erosion control



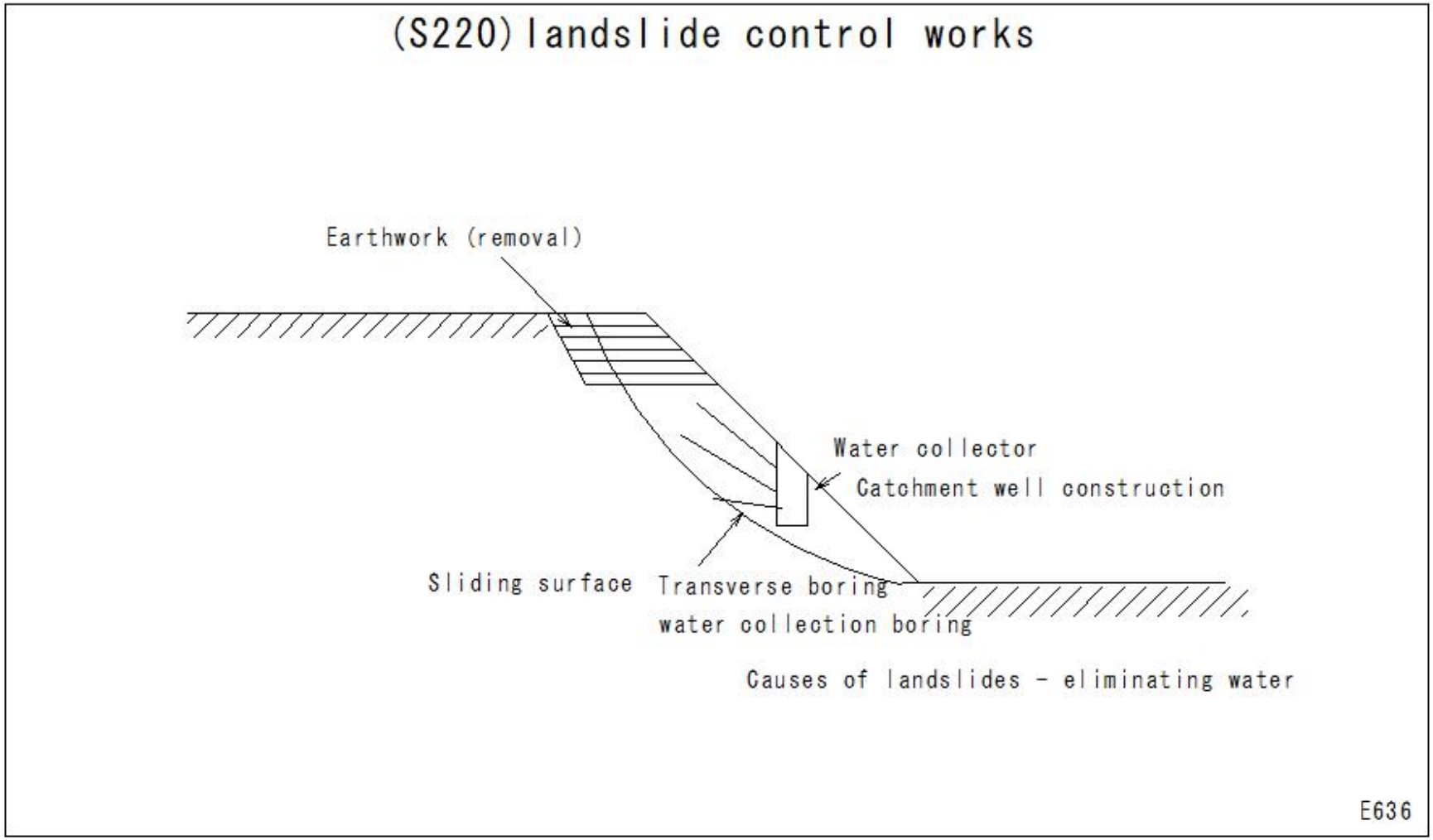
(S218)landslide



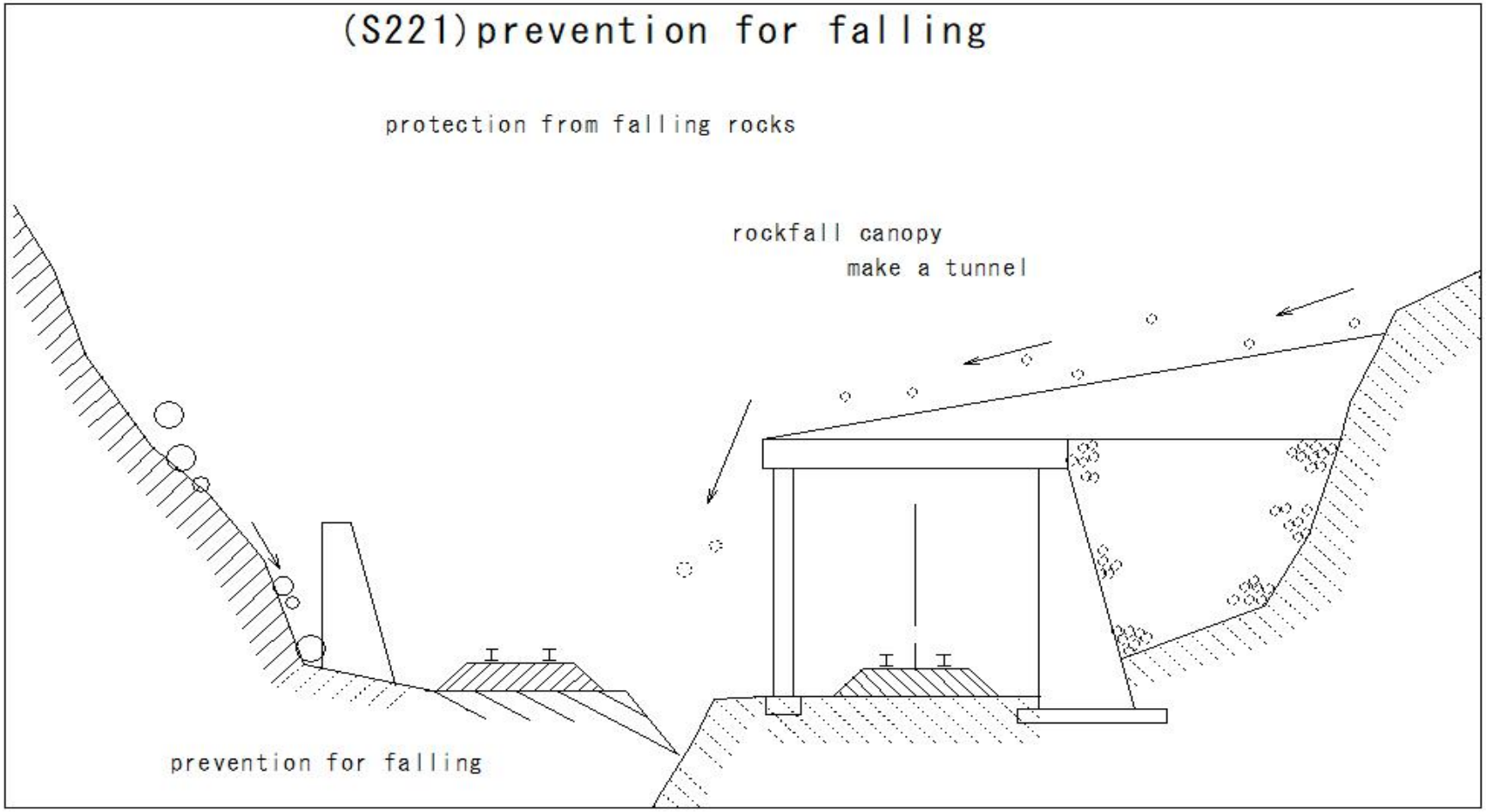
(S219)landslide restraining works



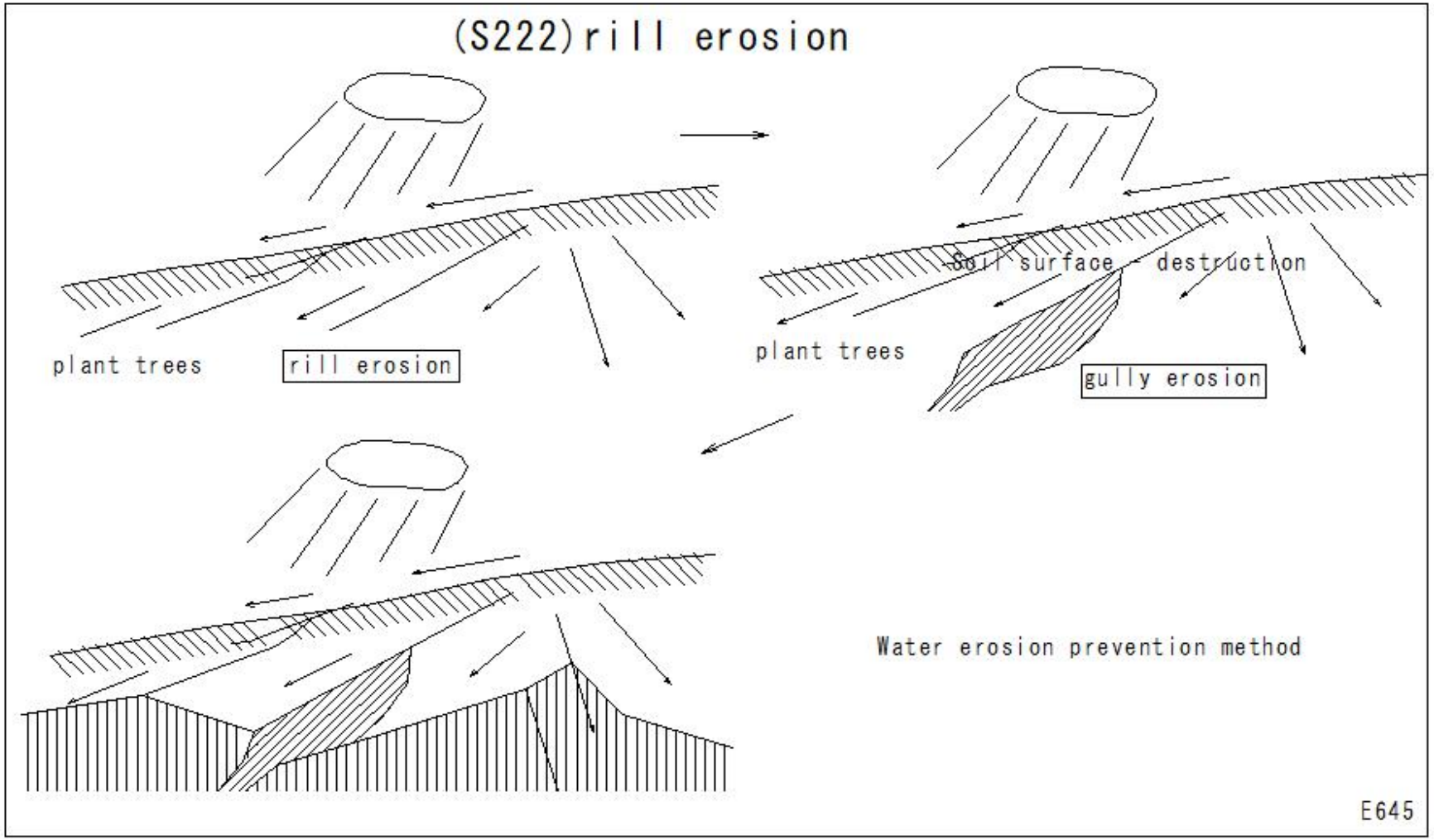
(S220)landslide control works



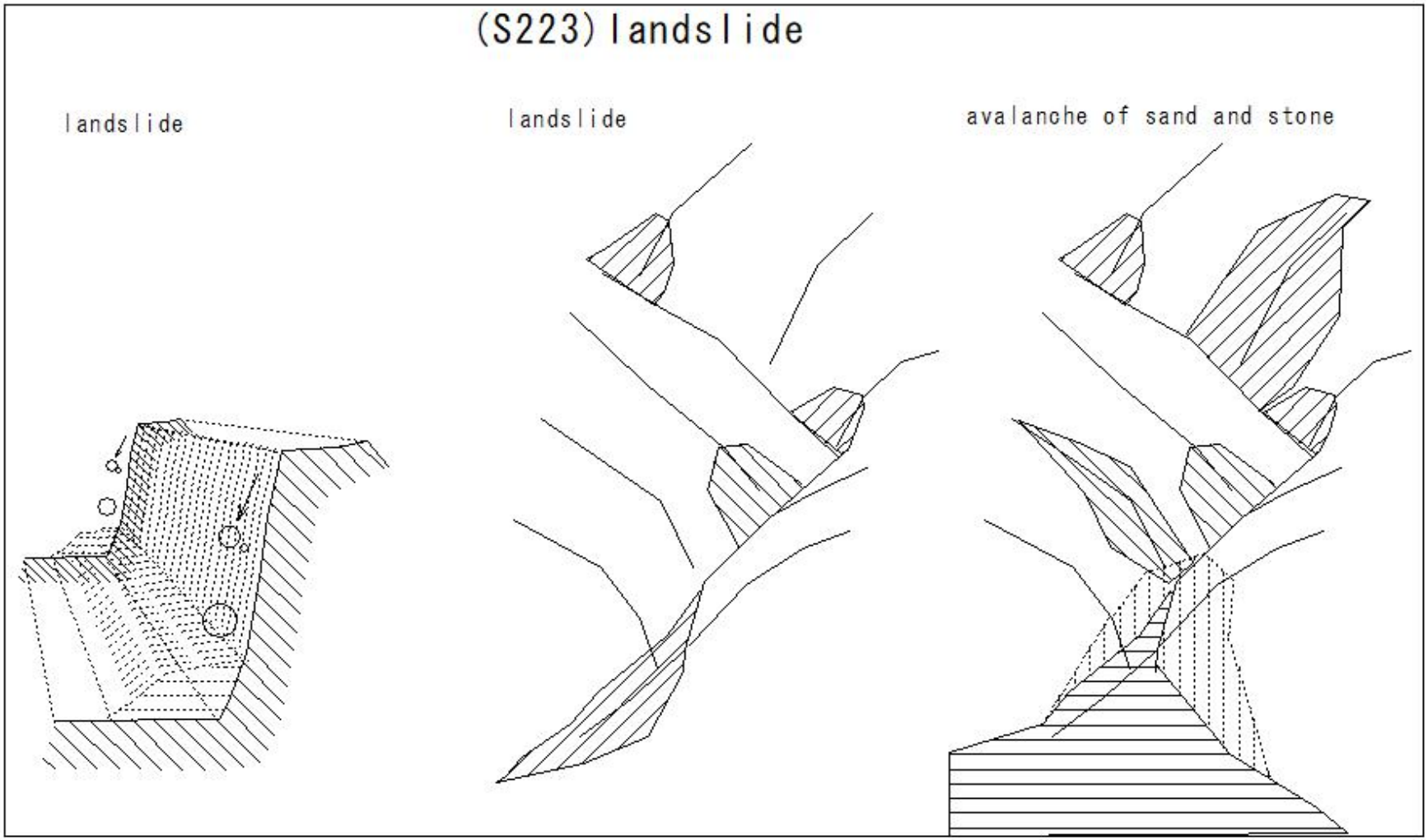
(S221)prevention for falling



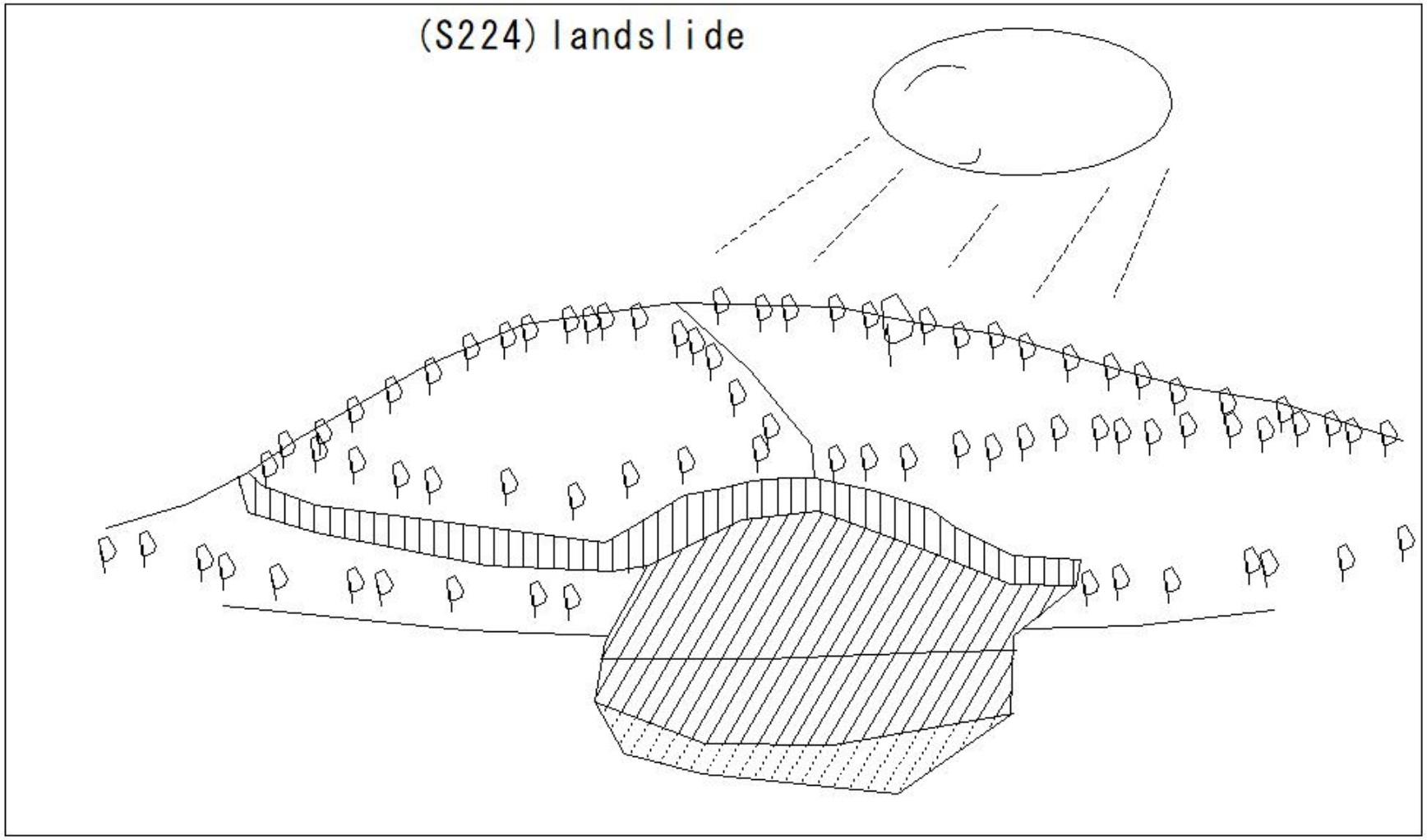
(S222)rill erosion



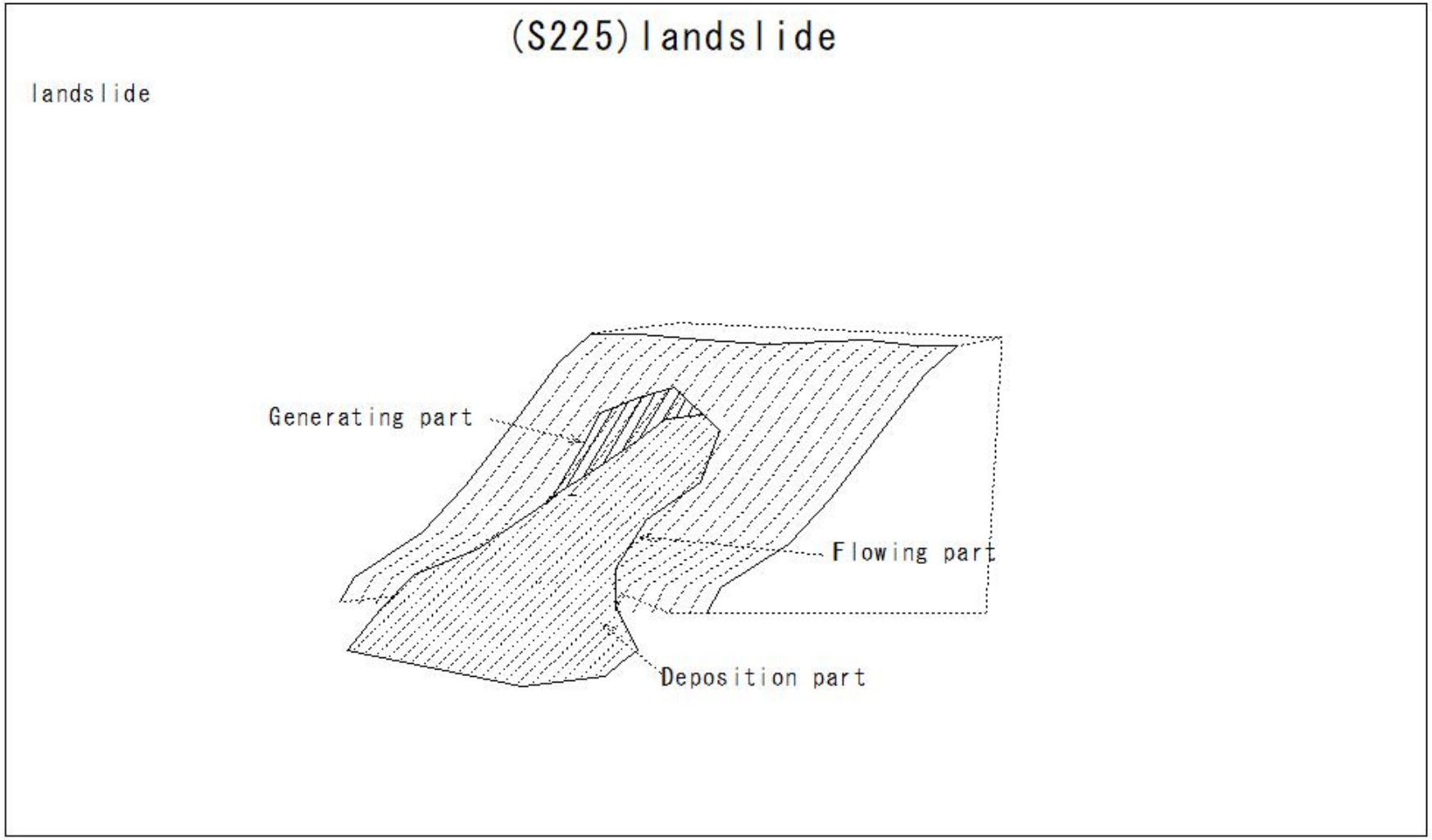
(S223)landslide



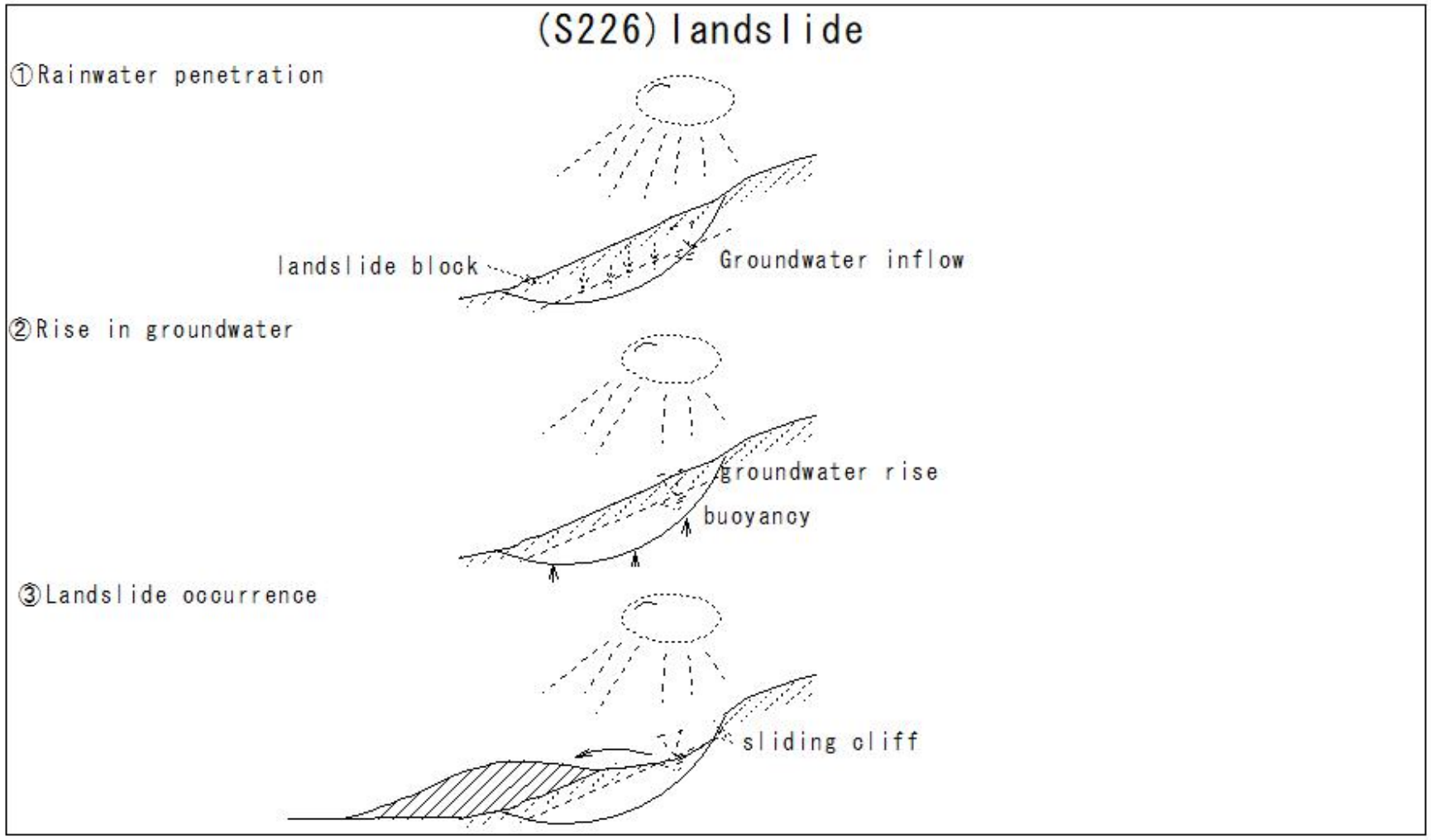
(S224)landslide



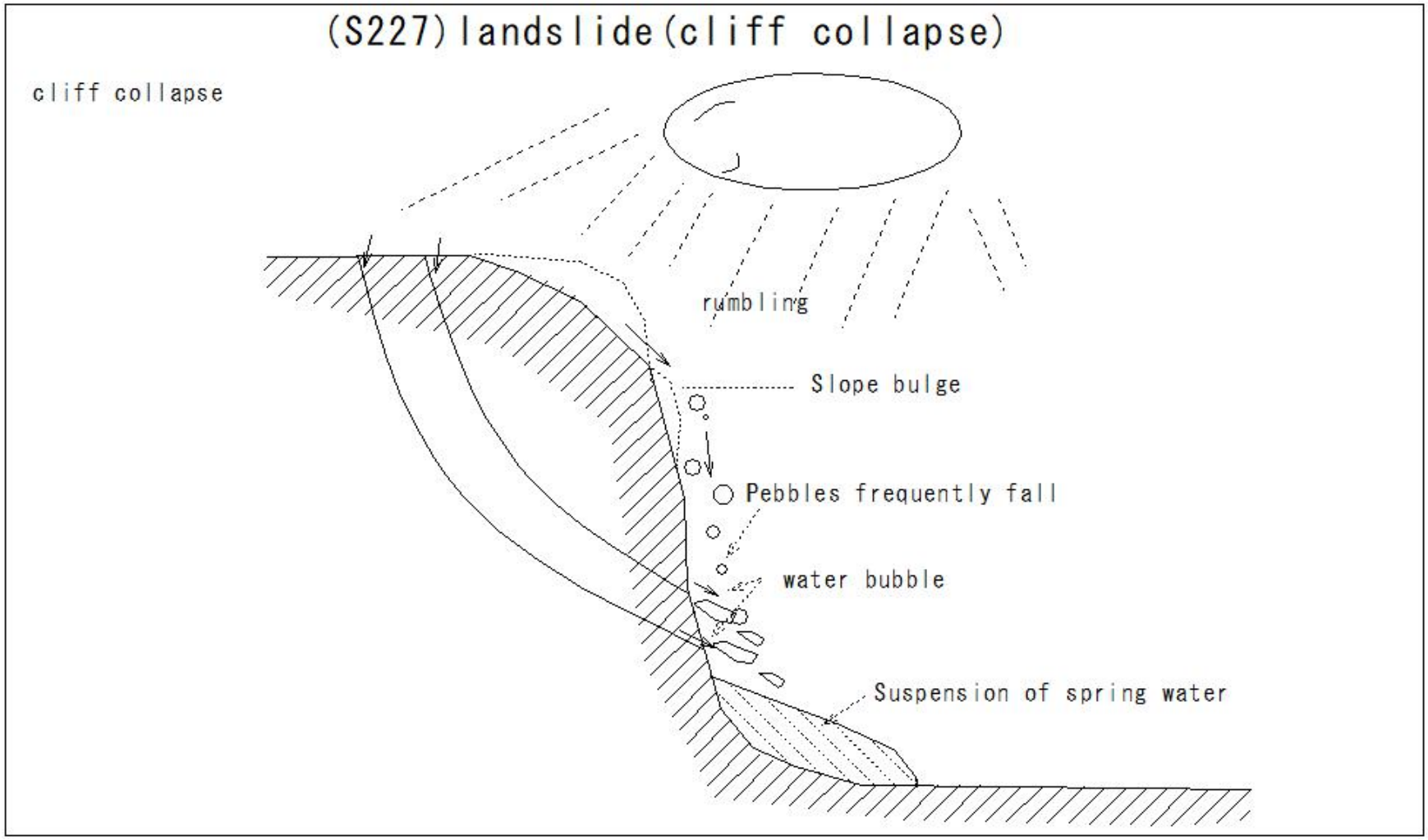
(S225)landslide



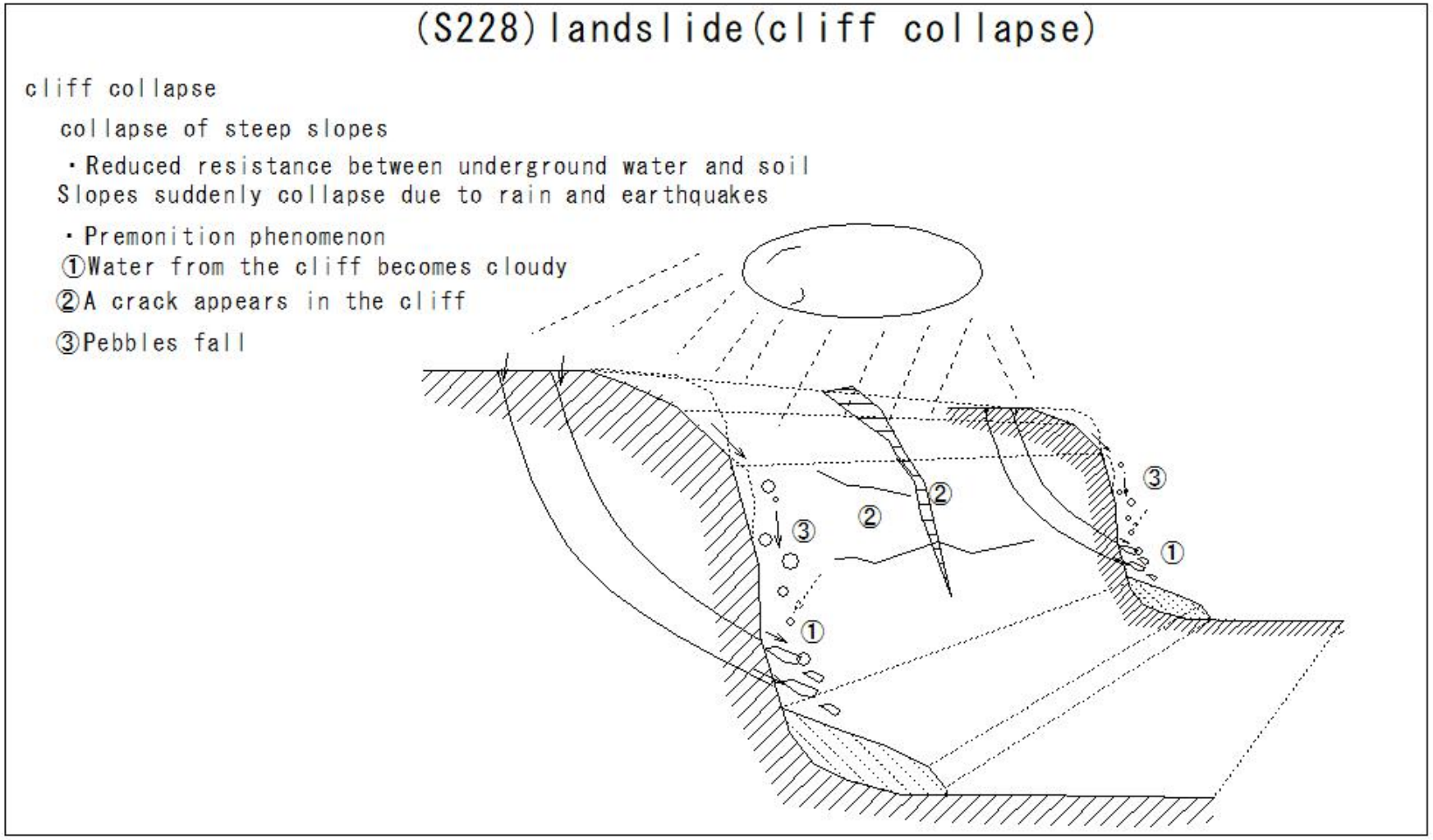
(S226)landslide



(S227)landslide(cliff collapse)



(S228)landslide(cliff collapse)



(S229)avalanche of sand and stone（debris flow）

(S229)avalanche of sand and stone (debris flow)

avalanche of sand and stone (debris flow)

Mountain stream: Stones and sediment on the riverbed are damaged by long rains or torrential rains.
swept downstream at once

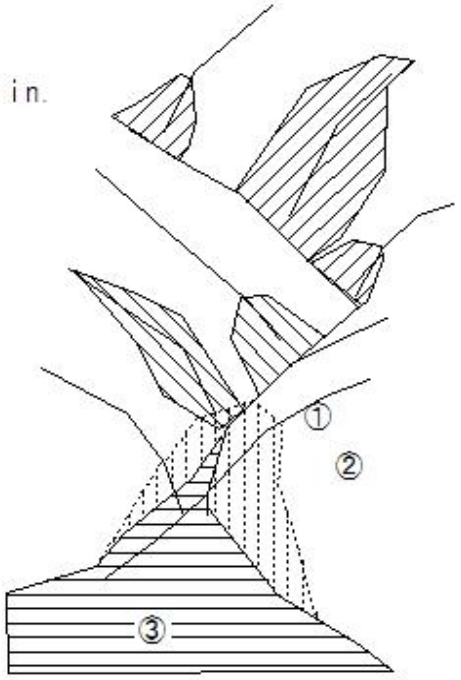
・Premonition phenomenon

①Mountain sound

②River water level falls

③The river flow becomes muddy and driftwood is mixed in.

avalanche of sand and stone



S223

(S230)landslide

(S230) landslide

landslide

Part of the slope (front part) moves down the slope due to the influence of groundwater and gravity

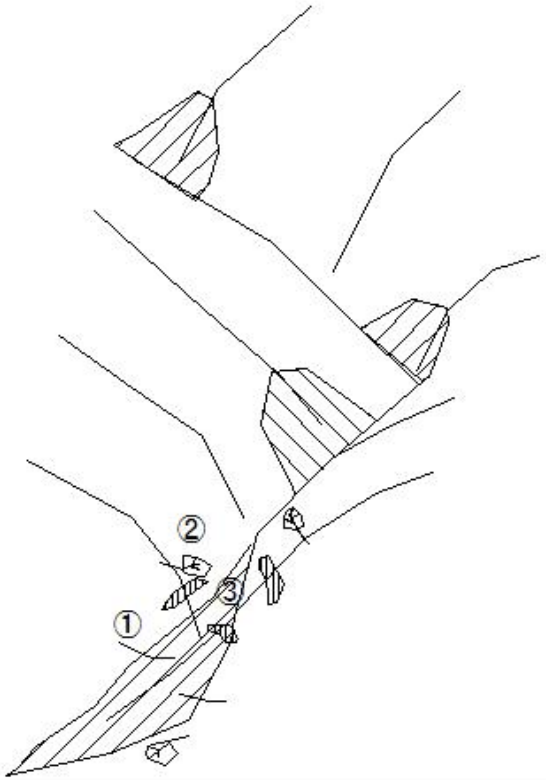
・Premonition phenomenon

①Cracks and steps occur in the ground

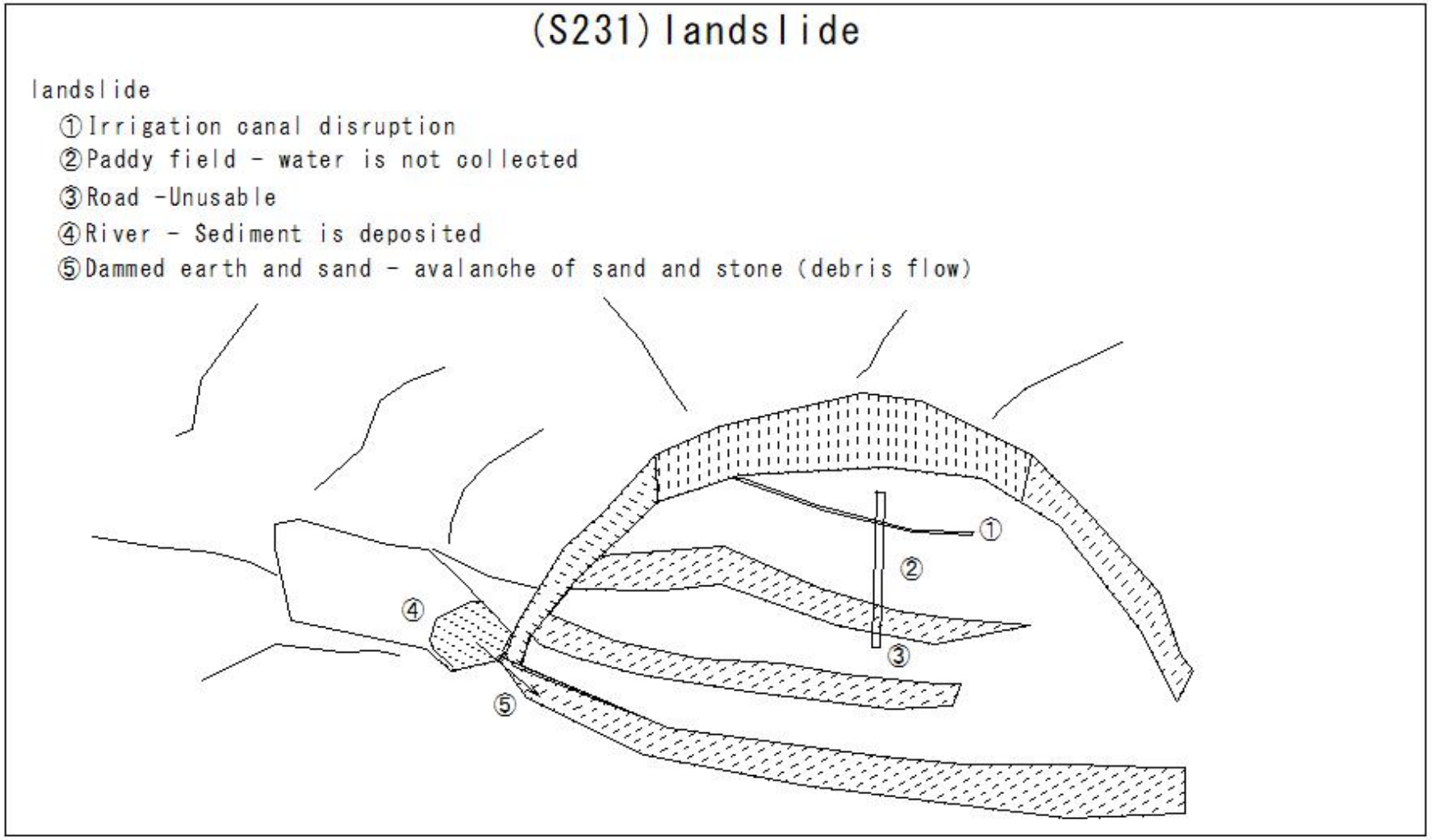
②Trees fall down

③Water gushes out from the slope

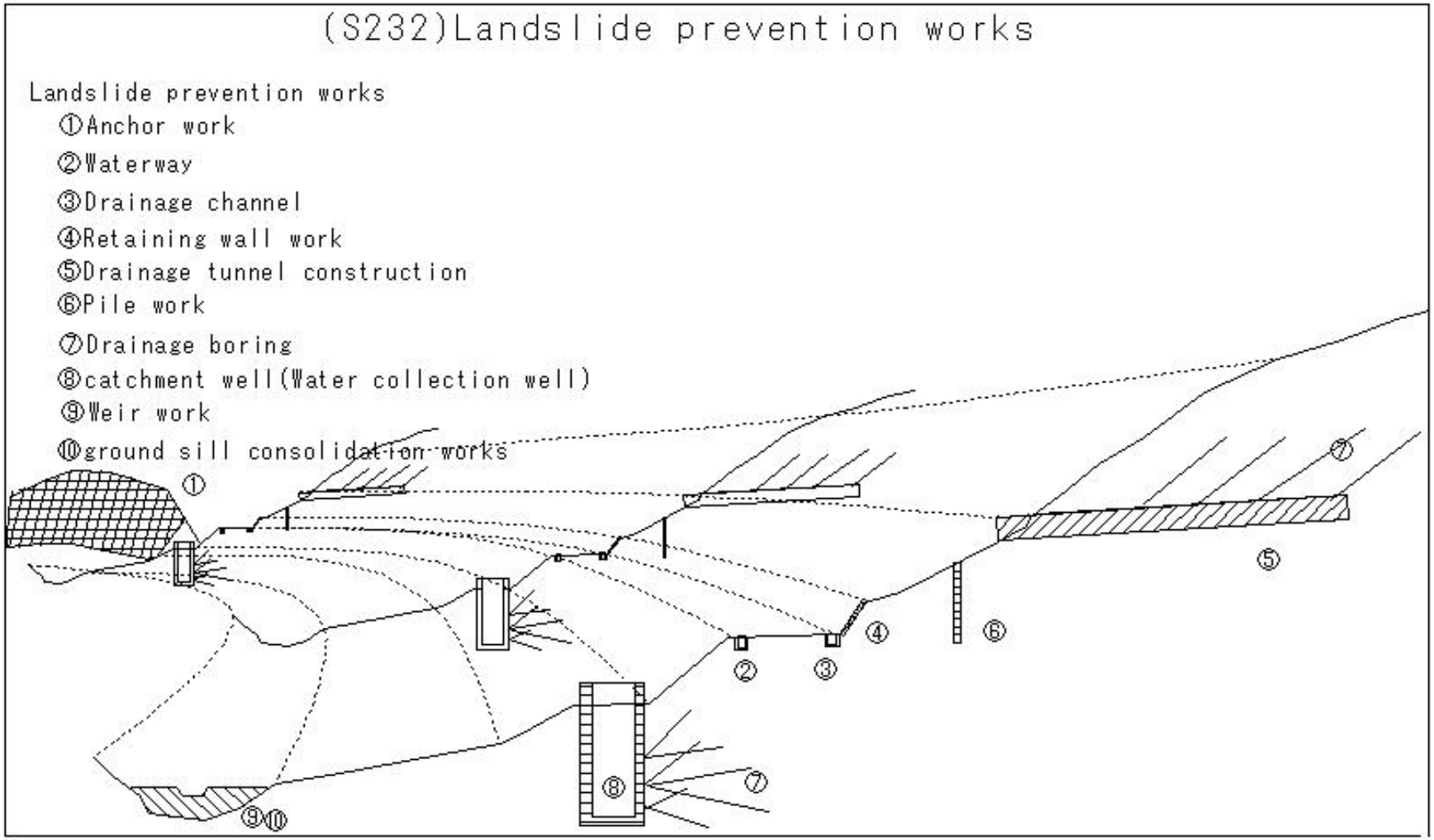
landslide



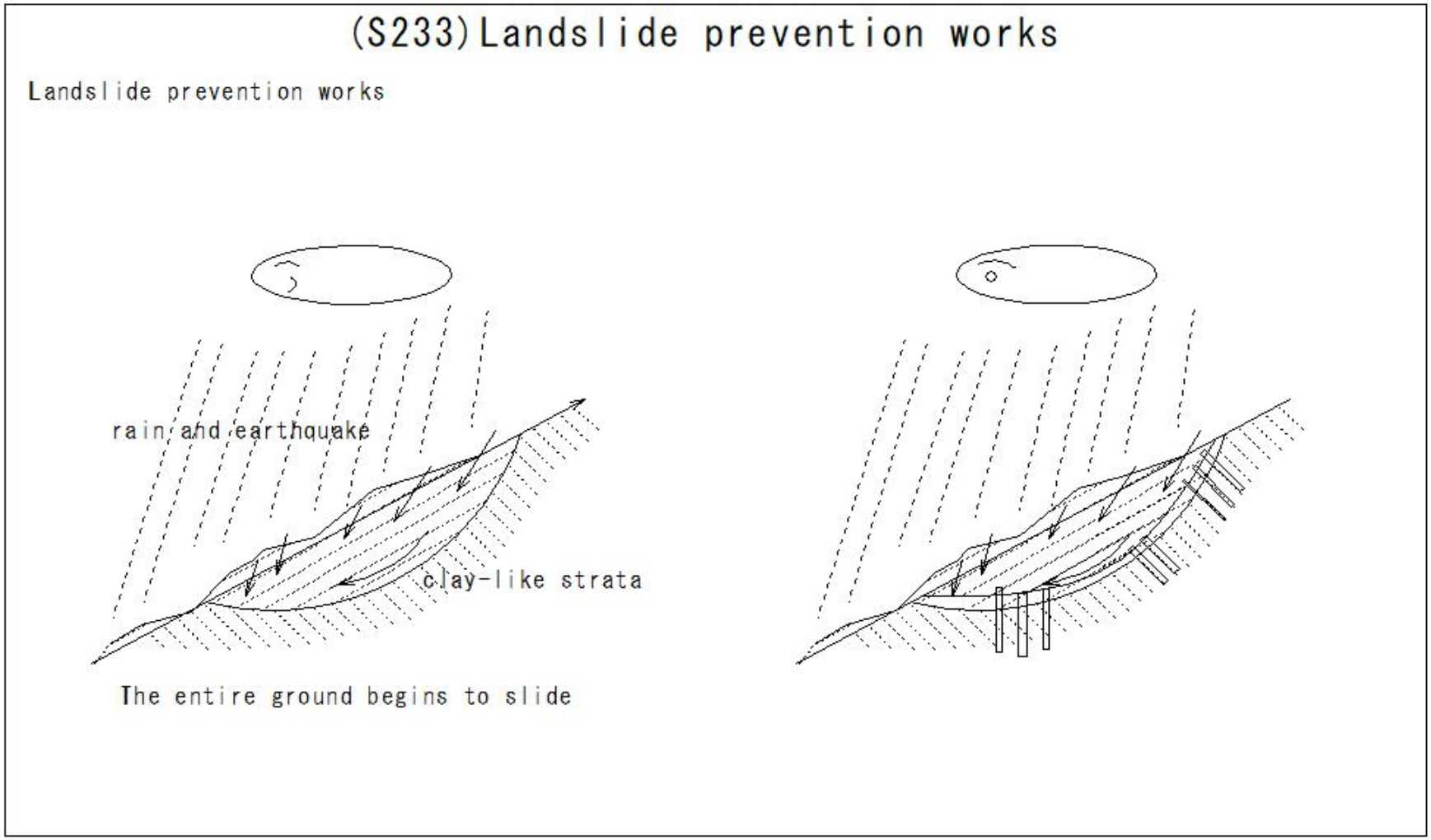
(S231)landslide



(S232)Landslide prevention works



(S233)Landslide prevention works



(S234)Landslide prevention works

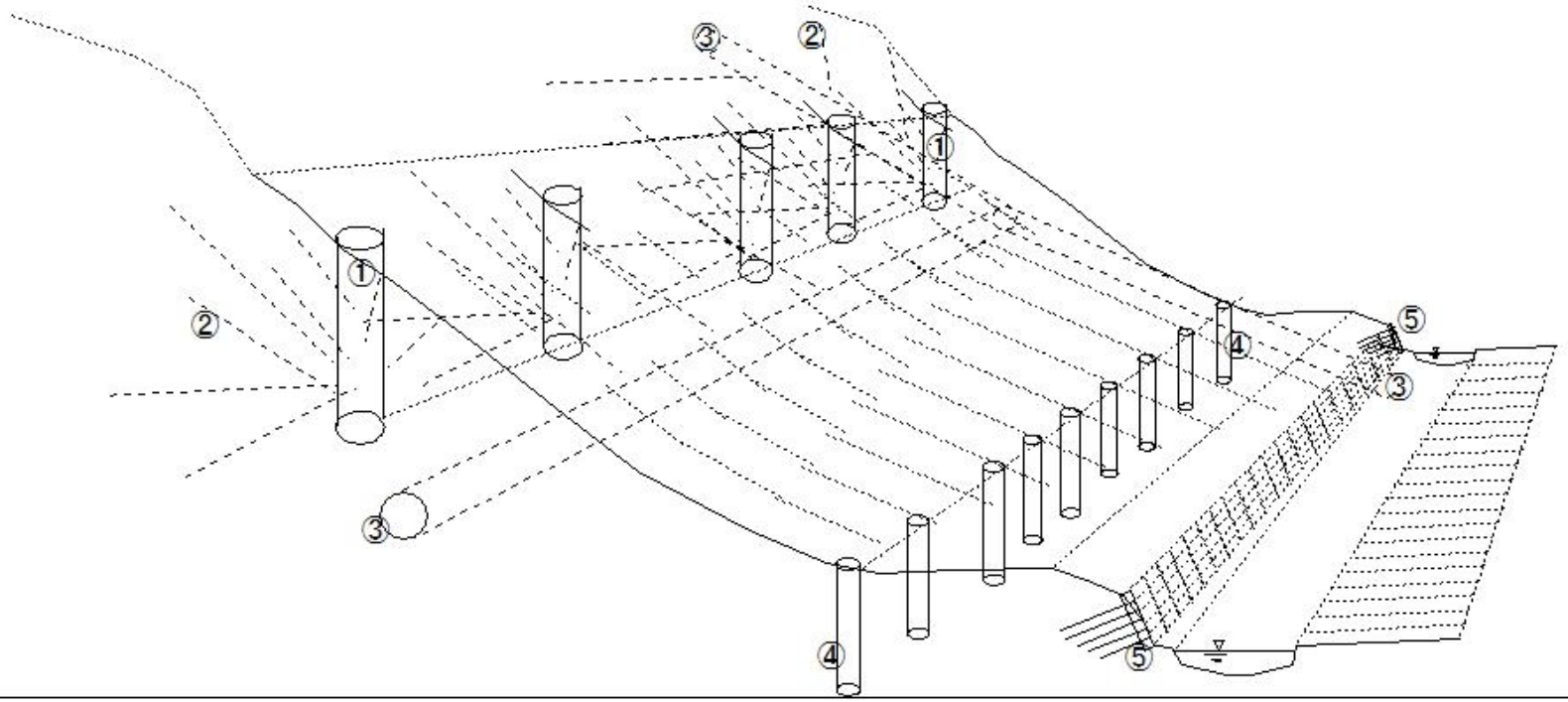
(S234)Landslide prevention works

Landslide prevention works

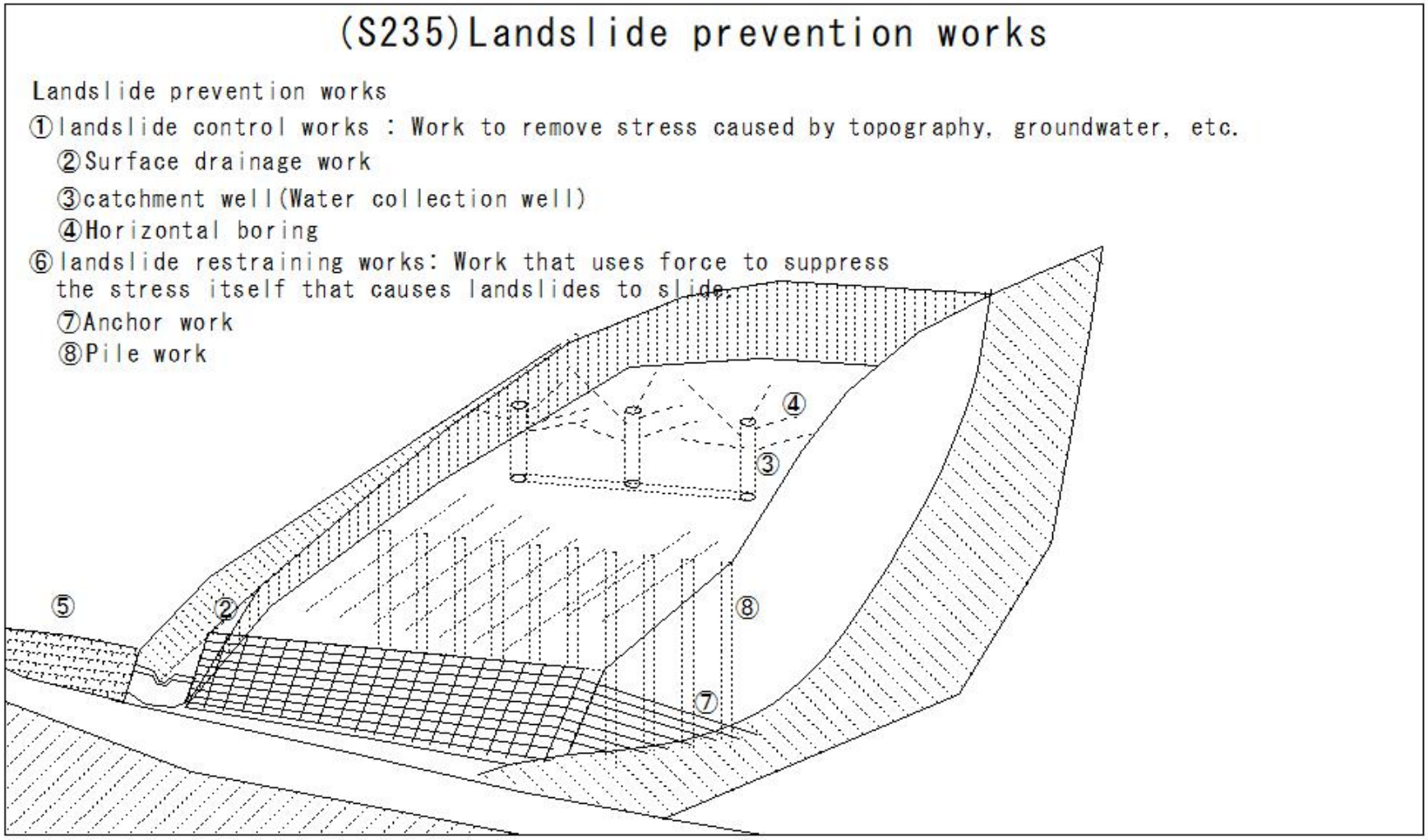
・landslide control works to drain groundwater from underground and increase safety

landslide control works (①catchment wells, ②catchment borings, ③drainage tunnels) directly stop the movement of the landslide with force.

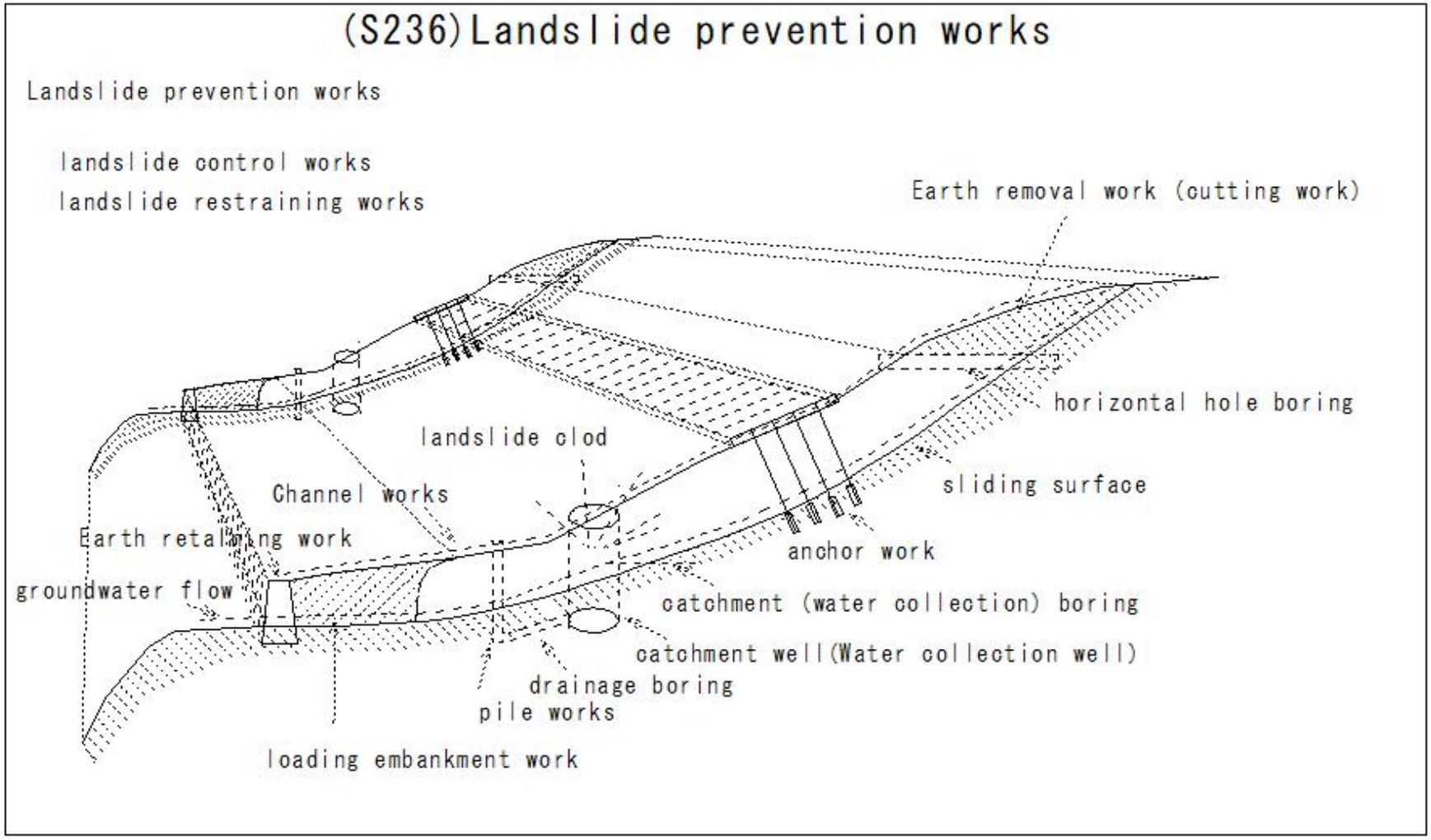
・landslide restraining works(④deep foundation work, ⑤anchored slope work)



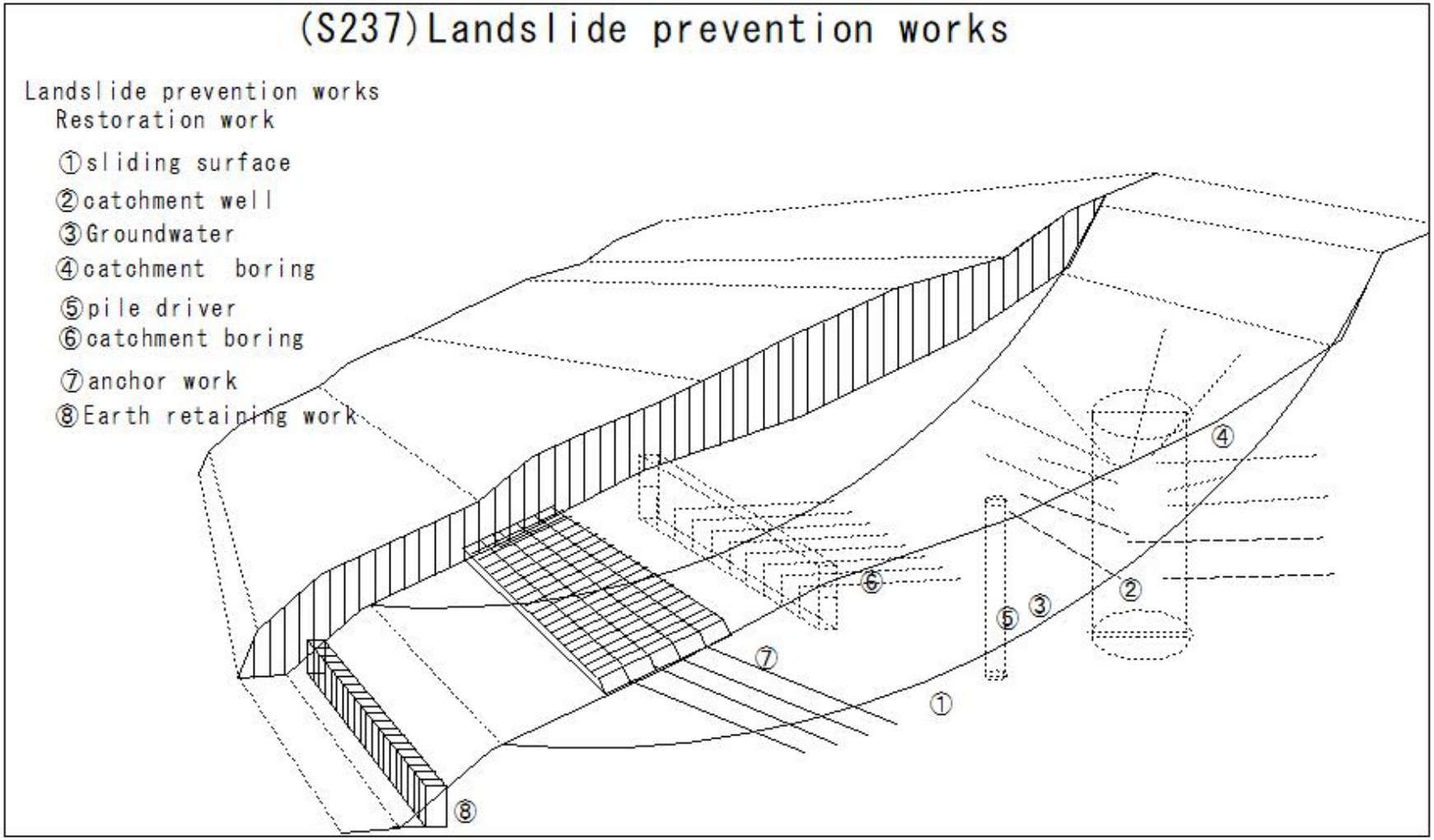
(S235)Landslide prevention works



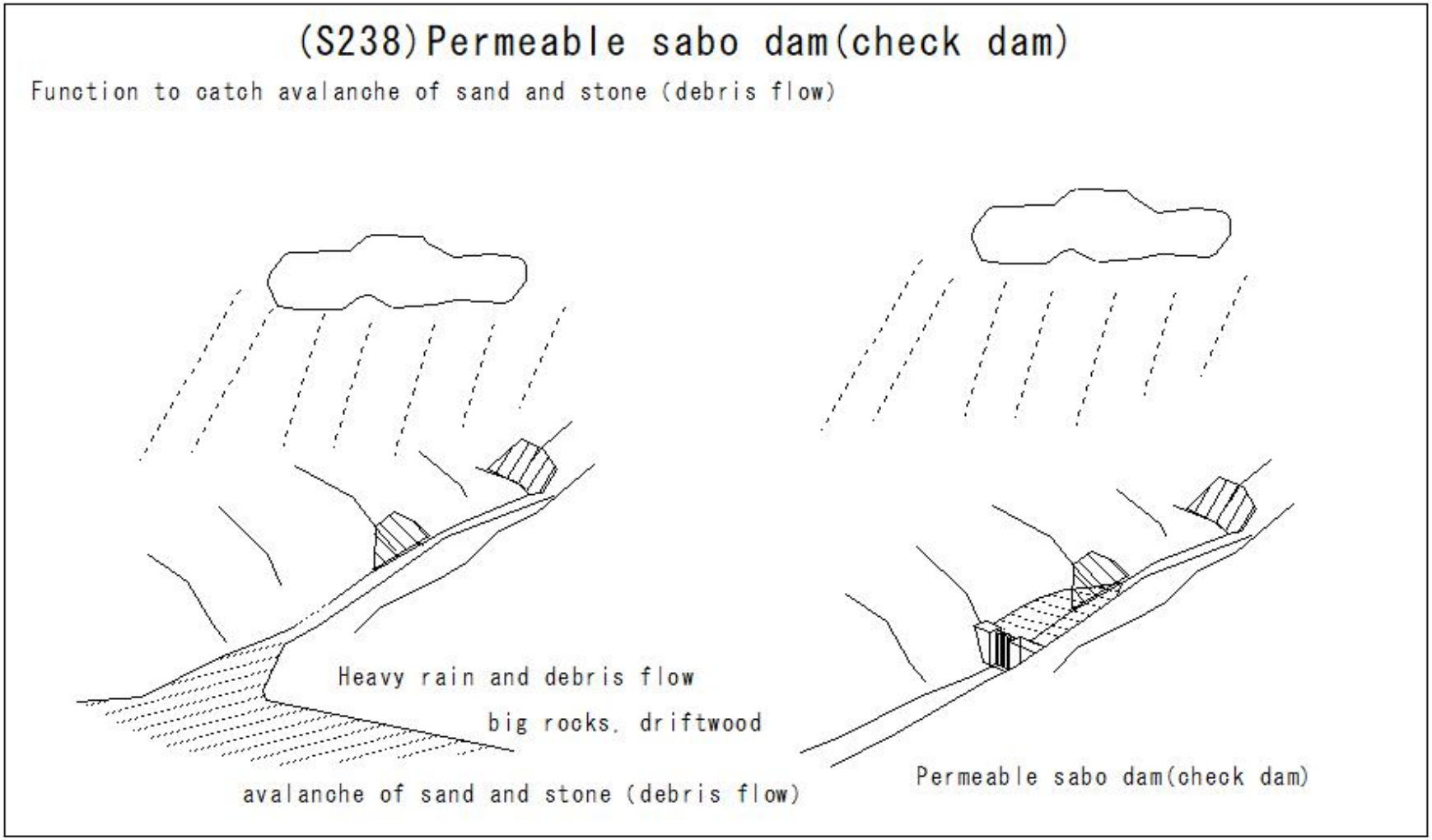
(S236)Landslide prevention works



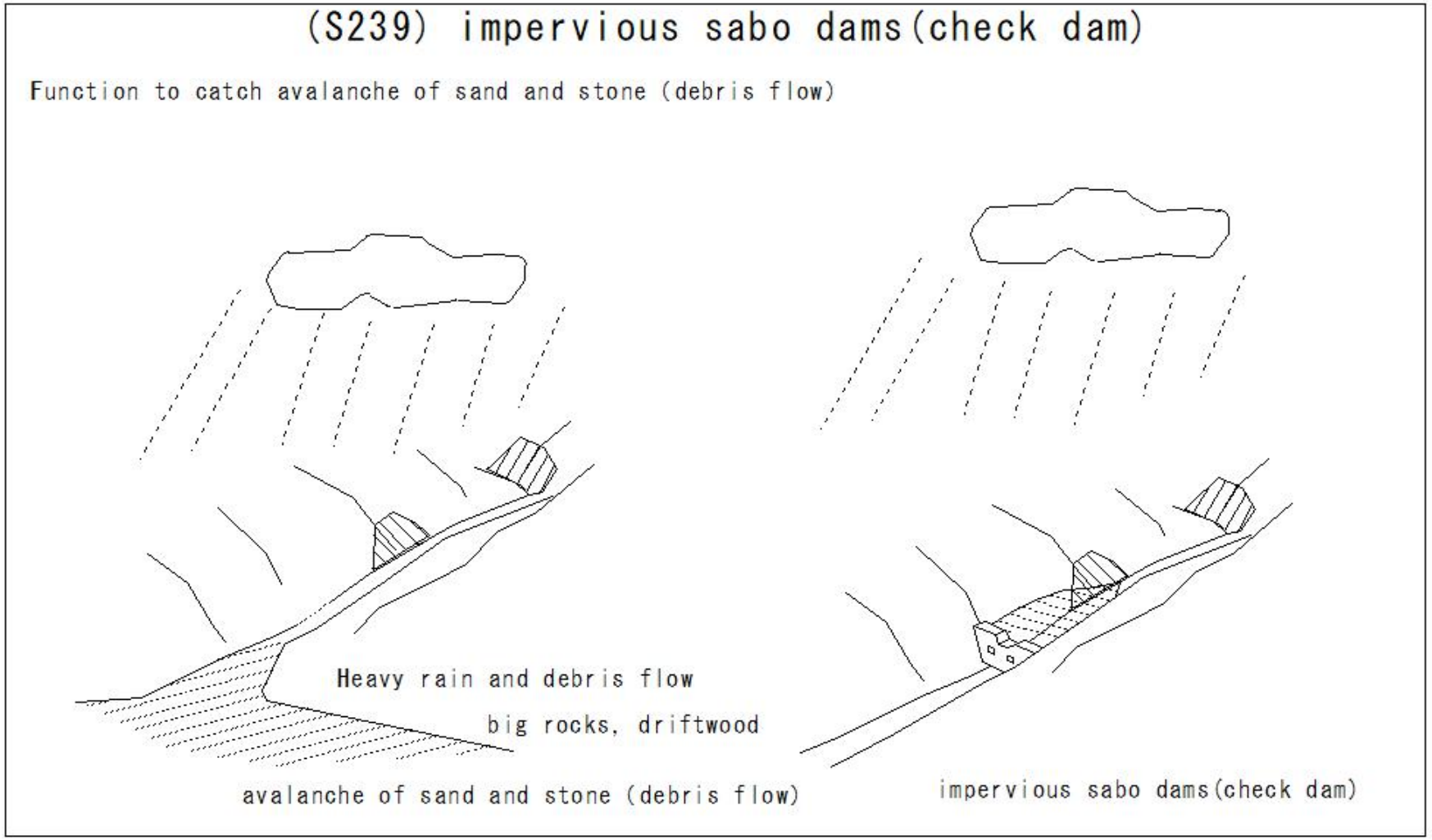
(S237)Landslide prevention works



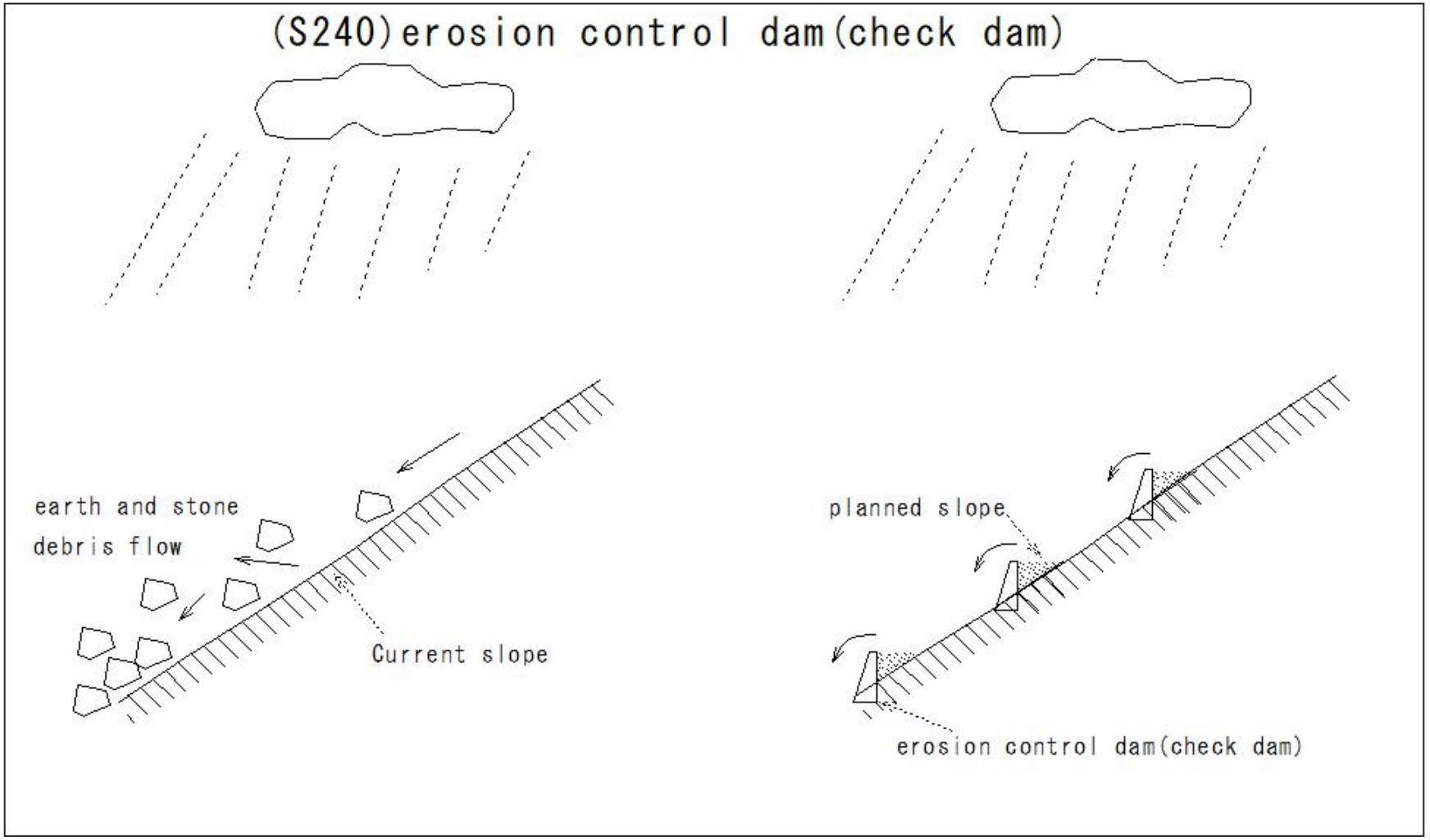
(S238)Permeable sabo dam(check dam)



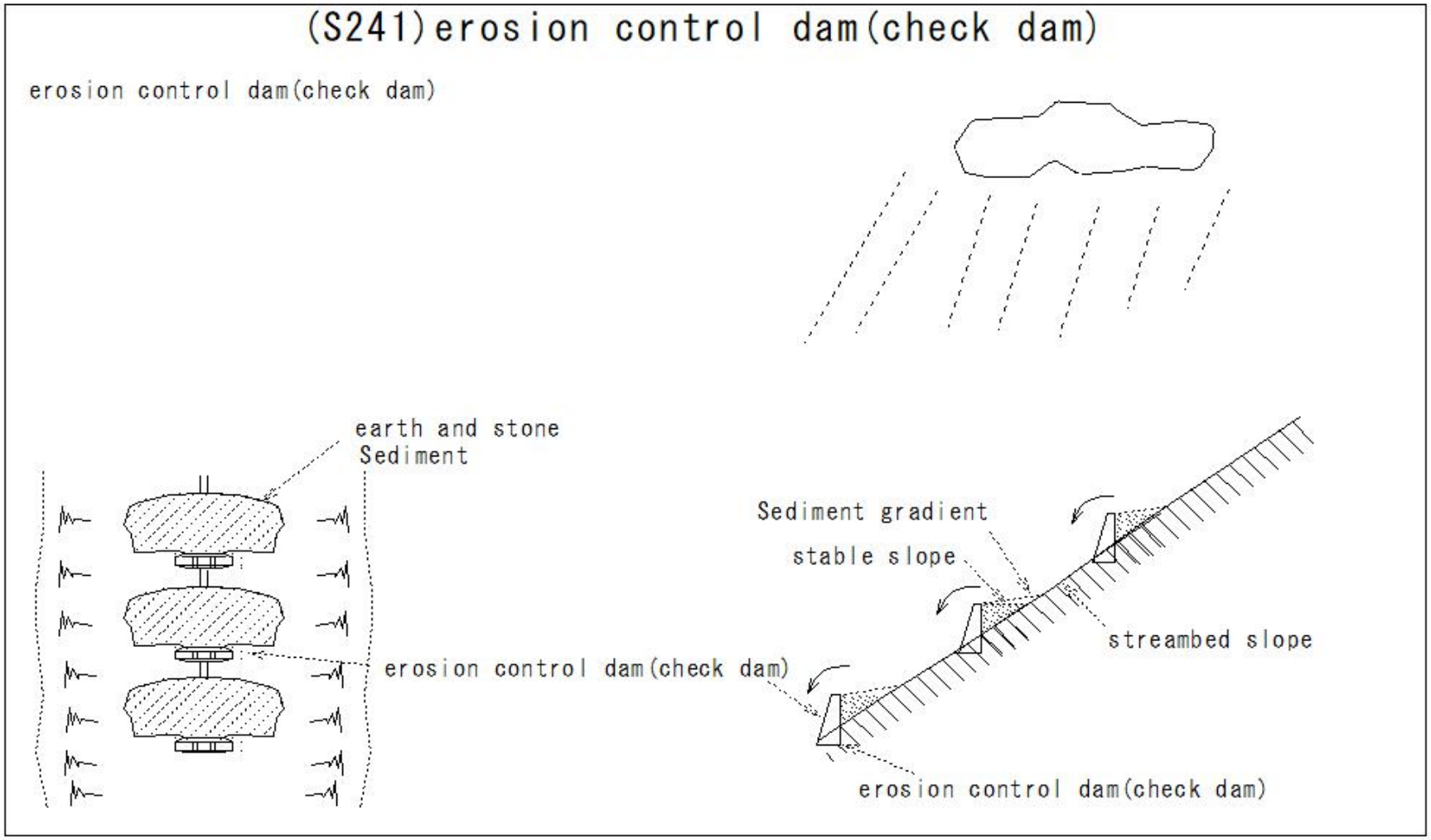
(S239) impervious sabo dams(check dam)



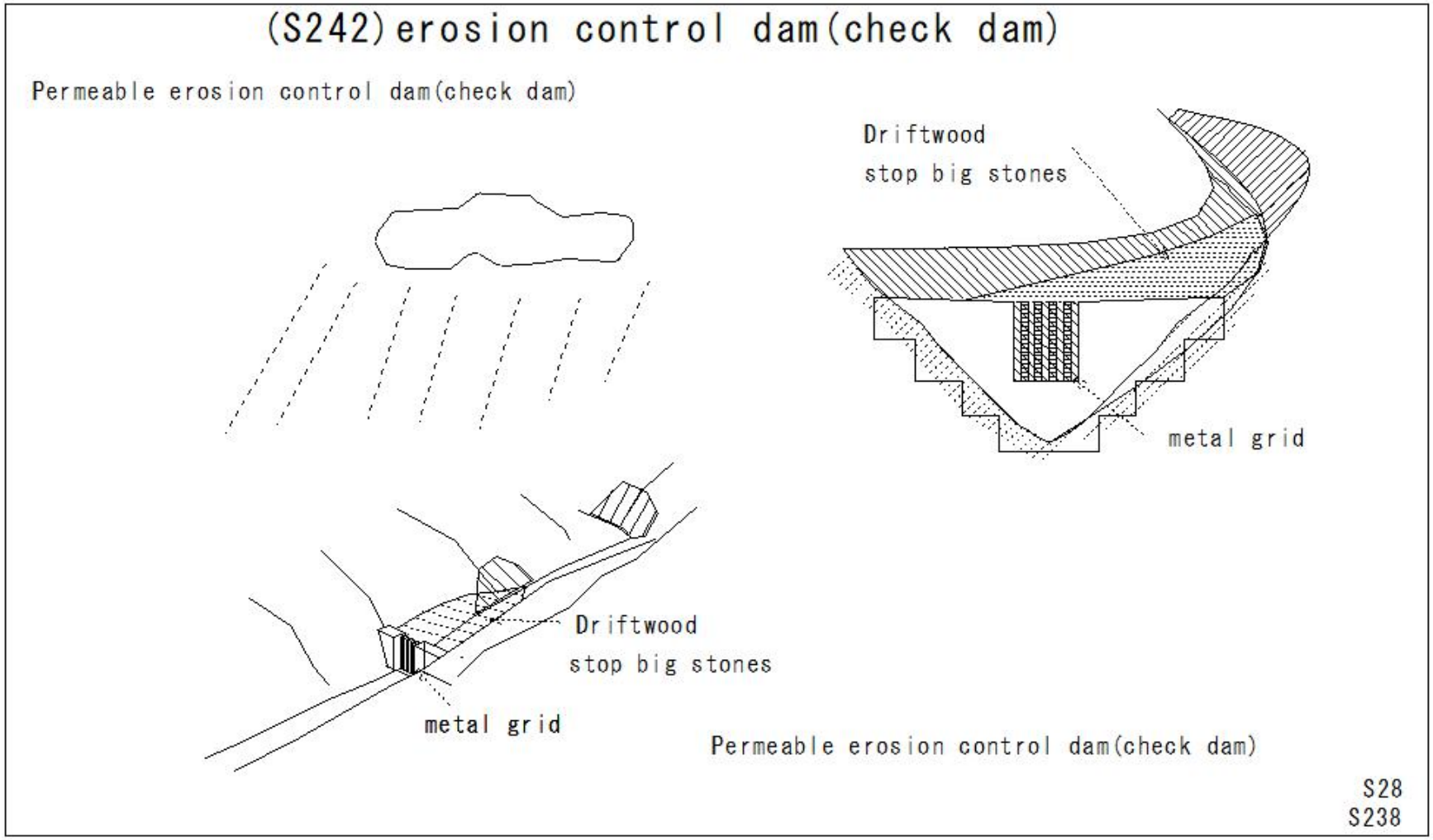
(S240)erosion control dam(check dam)



(S241)erosion control dam(check dam)



(S242)erosion control dam(check dam)



(S243)erosion control dam(check dam)

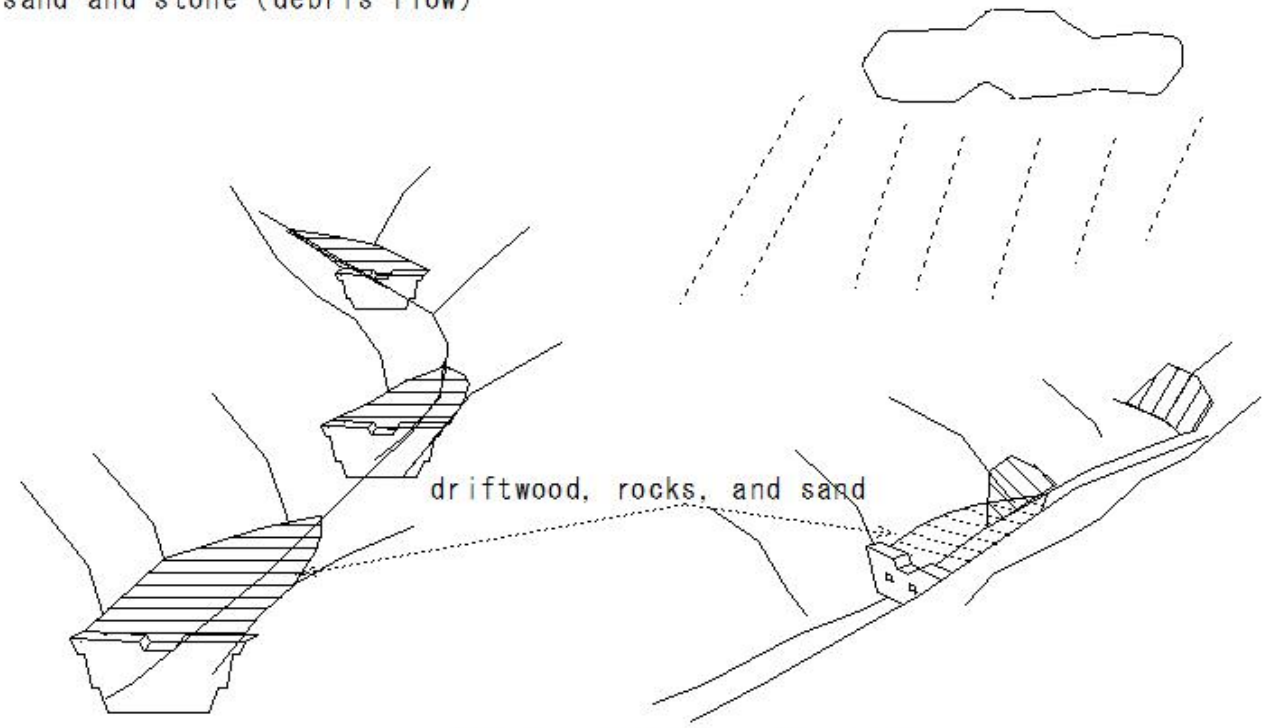
(S243)erosion control dam(check dam)

impervious sabo dams(check dam)

Possibility of floating driftwood crossing the dam

Collect driftwood, rocks, and sand

avalanche of sand and stone (debris flow)



impervious sabo dams(check dam)

S130
S239

(S244)erosion control dam(check dam)